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REMARKS ON THE ETIOLOGY OF SWINE-FEVER.

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In his most recent publication on Swine-plague Mr. Salmon maintains (Report of the Commissioner of Agriculture for the year 1886) that the infectious disease of swine known in America as Hog Cholera or Swine-plague, in this country as Swine-fever or Swine-plague, really comprises two different infectious diseases: (1) one disease is chiefly localised in the large intestine—hæmorrhagic ulcerative Enteritis—this is the Hog Cholera; (2) the other is chiefly an affection of the lung, the Swine-plague.

These statements are irreconcilable with the experimental evidence which I published in 1878 (Reports of the Medical Officer of the Local Government Board for 1877-78), and with the observations made also on the disease naturally occurring amongst swine. I have shown in that report, by numerous experiments, that by inoculation or by feeding of healthy pigs with particles of the diseased lung, or of the ulcers of the large intestine or of the peritoneal exudation, the same disease is produced; from the *post-mortem* examination of such experimental animals, as well as those that had become naturally affected with the disease, I have shown that it is chiefly the lung, next also the large intestine, which is subject to the disease, and I have therefore spoken of it as infectious Pneumo-enteritis. By injection as well as ingestion of matter taken from the ulcers of the large intestine, I have produced in healthy pigs the typical disease of the large intestine and also of the lungs; further, by injection of matter taken from the

diseased lung I have produced in healthy pigs the typical disease, both of the large intestine and of the lung. There can be no question, from an inspection of my records of *post-mortem* examinations of these experimental animals (*l.c.* pp. 183—207, experiments i.—xxii.), about the unity of the pulmonary and intestinal disease. An appearance to which I have drawn attention in the above report, is the hæmorrhage in the endocardium, chiefly of the left ventricle about the mitral valve (*l.c.* plate xxii., fig. xxxi.). These hæmorrhages were seldom missed on *post-mortem* examination of the animals affected naturally or experimentally, either with lung disease, with simultaneous intestinal ulcerations, or with lung disease only. During this year I have had the opportunity, thanks to Mr. C. Humphrey, veterinary inspector in Wandsworth, to notice an isolated epidemic of Swine-fever that had occurred in the farm belonging to and supplying the county asylum at Wandsworth. This epidemic is instructive, because it occurred in a positively isolated locality; that is to say, a locality that does not stand in any communication, either by the attendants or by purchases and introduction of fresh pigs, with the neighbourhood. On this farm the number of pigs generally present is just over 100, when fresh farrows about 200. The supply of pork, owing to the large number of inmates in the asylum, is very considerable, and is all derived from the farm.

The last outbreak of Swine-fever in this farm occurred in April, 1886, and since that time till March, 1888, no case had occurred. In this year's epidemic the first case was noticed on March 8. Mr. Humphrey, on *post-mortem* examination, pronounced it a case of Swine-fever, the intestine and lungs showing the typical disease. Till the middle of April 61 pigs had been examined, and found affected with Swine-fever. Of them only 31 had the intestinal disease (ulcers of large intestine), in 30 the intestine was free of disease, but all 61 had the typical disease of the lungs, and most of those examined in this direction had the hæmorrhages in the endocardium of the left ventricle. Now, it is extremely unlikely that that first pig had two different diseases, and it is also very unlikely that 31 pigs, *i.e.*, those in which lungs and intestine were affected, had two diseases, while 30, *i.e.*, those in which the disease of the intestine was absent, and only the lungs were found affected, had the single disease. These observations harmonise well with those recorded in 1877-78, viz., while the lung affection is constantly present, that of the intestine is absent in a number of cases. Neither in 1877-78 nor in this epidemic at Wandsworth, was there a single case with intestinal disease only, without the lungs being involved.

PELVIC ABSCESS, PROBABLY A SEQUELA OF CASTRATION.

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THE patient was a bay Persian gelding, about 14.2 in height, reported to be about six years old. He had been purchased for tramway work a few months before, and castrated by cautery. He had done very well after the operation. About the middle of 1887 he was observed to be out of sorts, and to constantly have a temperature above the normal, but no definite disease could be detected about him, nor any marked symptoms of disorder. He was kept under treatment for fever, but did not progress favourably, so I was requested to examine him and take him in hand. The case was exactly as reported, there being no signs of distinct disease of the various internal organs until we came to per-rectal exploration; then a slight globular enlargement (of the remains of the spermatic cord, it was presumed) was detected, and proved painful on pressure. The castration wound on this side had healed up normally, the external ring and inguinal canal seemed all correct, and the case altogether admirably illustrated the value of temperature records as a guide to detection of departure from a general state of health, and per-rectal exploration as a means of exact diagnosis, in some cases also for early detection of such disease as that on hand. The rectal examination had been made in this case as part of the routine investigation of an obscure disorder, and until it was ascertained that a tumour lay against the internal abdominal ring the apparently successful operation performed several months before was not much suspected as a cause of the attack. However, we had now something to work on, and a probable cause of the fever to deal with, not a very accessible one for treatment, and one liable to endanger the life of the patient. Nothing could for the present be done but give warm enemata, keep the bowels lax, and support the strength of the animal. My records are not to hand to show me the various agents and means used and the phases of the attack, but the tumour became larger, and the patient very intolerant of rectal examination; there were abdominal pains, and the animal became very weak. Several times he was *deploratus a medicis*, and full arrangements were made to operate either through the inguinal canal or the rectum, as circumstances might suggest. The fæces managed to pass the swelling satisfactorily, and the patient stuck to his feed, and was one of the most "plucky" ones I have had to deal with while in India. He *would* not give in, and at length swelling began to take place externally, in response to assiduous

fomentation at the groin, and he was afforded some relief. As soon as possible the abscess was opened, and some three or four pints of well-matured pus came away freely. The patient was now extremely emaciated, and the case became complicated by infiltration of pus into the structures of the abdominal wall, so that we had to open successively accumulations at various points, extending even so far forward as between the fore-legs. At last all local troubles ceased, and it only remained to nurse the patient from extreme emaciation to working condition; so he was discharged to the tramway stables (from our hospital, where he had been treated since shortly after I first saw him), and successfully nursed there, and ultimately proved an excellent worker. This case is published as being one of a rather unusual sequela of castration, and as being in support of the inadvisability of surgical interference in cases of Pelvic Abscess. There is an element of doubt on the latter point, however, for possibly the patient would have recovered sooner if operated on earlier. He was over three months in hospital. As far as the result went, we had no reason to regret having simply encouraged nature's efforts to get the abscess to burst externally. There was a minimum amount of Peritonitis, and no evidence of tendency to burst into bladder, rectum, or peritoneal sac.

ON SOME OF THE COMMUNICABLE DISEASES OF MAN AND THE LOWER ANIMALS, WITH REMARKS ON THEIR ORIGIN AND RELATION.*

BY EDGAR CROOKSHANK, M.B., LONDON.

I PROPOSE to bring to your notice some of the diseases communicable from the lower animals to man, and to discuss certain points in connection with their origin and relation; and I shall also deal with those diseases in man which have been *alleged* to arise from diseases of the lower animals. The diseases to which I refer I shall divide, for the purposes of discussion, into three groups. First, I shall draw your attention to some communicable diseases which are transmitted to man, but do not arise in man independently of the lower animals, such as Cow-pox, Foot-and-mouth Disease, Anthrax, and Glanders.

Cow-pox.—Jenner was the first to describe the disease which had been known in the dairy counties from time immemorial as the "Cow-pox," and his publications led to a careful study of the

* A paper read at the annual meeting of the Midland Branch of the British Medical Association, held at Nottingham, June 14th, 1888.

diseases affecting the teats of cows. I will quote verbatim the description which Jenner wrote in his "Inquiry," as it contains his views as to the origin of Cow-pox, and gives a graphic account of the transmission of the disease to the hands of the milkers.

"There is a disease to which the horse, from his state of domestication, is frequently subject. The farriers have termed it the *Grease*. It is an inflammation and swelling in the heel, accompanied in its commencement with small cracks or fissures, from which issues a limpid fluid, possessing properties of a peculiar kind. This fluid seems capable of generating a disease in the human body (after it has undergone the modification I shall presently speak of) which bears so strong a resemblance to the Small-pox that *I think it highly probable it may be the source of that disease.* In this dairy country a great number of cows are kept, and the office of milking is performed indiscriminately by men and maid-servants. One of the former having been appointed to apply dressings to the heels of a horse affected with the malady I have mentioned, and not paying due attention to cleanliness, incautiously bears his part in milking the cows, with some particles of the infectious matter adhering to his fingers. When this is the case it frequently happens that a disease is communicated to the cows, and from the cows to the dairy-maids, which spreads through the farm until most of the cattle and domestics feel its unpleasant consequences. This disease has obtained the name of the *Cow-pox*. It appears on the nipples of the cows in the form of irregular pustules. . . . Inflamed spots now begin to appear on different parts of the hands of the domestics employed in milking, and sometimes on the wrists, which run on to suppuration, first assuming the appearance of the small vesications produced by a burn. . . . Absorption takes place, and tumours appear in the axilla. . . . These symptoms, varying in their degrees of violence, generally continue from one to three or four weeks, leaving ulcerated sores about the hands, which from the sensibility of the parts are very troublesome, and commonly heal slowly, frequently becoming phagedænic, like those from whence they sprung. During the progress of the disease the lips, nostrils, eyelids, and other parts of the body are sometimes affected with sores, but these evidently arise from their being heedlessly rubbed or scratched with the patient's infected fingers. . . . Thus, the disease makes its progress from the horse, as I conceive, to the nipple of the cow, and from the cow to the human subject."

I need hardly say that as this disease is one of the sources of lymph employed for affording protection against Small-pox, it is of immense interest and importance. It is therefore much to be

regretted that the clinical history of the natural disease in the cow has been, until recently, so much neglected in this country, both by the veterinary profession and our own. It is commonly supposed that both Cow-pox and Horse-pox have been absent from this country during the long period succeeding the outbreaks described by Jenner, Loy, Ceely, and Estlin; but inasmuch as outbreaks bave been comparatively common during this period in other countries, it is far more probable that outbreaks have occurred in England, but have been concealed, overlooked, or wrongly diagnosed. I shall again refer to Jenner's "Inquiry" in speaking of the alleged origin of Small-pox. I shall therefore now pass on to describe another vesicular disease affecting the cow's teat—of especial interest to us, as the virus is conveyed by the milk.

Foot-and-mouth Disease.—This is a highly contagious and infectious febrile disease, characterised by a vesicular eruption affecting the lips, tongue, roof of the mouth, and the feet of sheep, cattle, and pigs. Sometimes the mouth only is affected; in other cases the feet may be the principal seat of the eruption. In milch cows it sometimes happens that the eruption occurs on the udder and teats, and it is this manifestation of the disease which has received so much attention from Rayer. The milk is contaminated by the discharge of the vesicles, and is unfit for use, either as food for the human being or for the lower animals. It induces a vesicular eruption in the mouth, larynx, pharynx, and intestinal canal. It acts most vigorously when administered warm to young animals, and calves occasionally die quite suddenly after sucking cows affected with the eruption on the teats. Fatal effects also result when the milk is administered to young pigs.

It has been stated that no injurious consequences arise from the consumption of the milk by human beings, but there is abundant evidence to the contrary, and the conflicting opinions probably arise, as Brown has pointed out, from the fact that milk is seldom drunk direct from the cow, and rarely in an undiluted form. Hertwig experimented upon himself with milk freshly drawn from a cow with the eruption. He drank a pint, and two days afterwards experienced slight fever, restlessness, and headache. The mouth was dry and hot, and there was tingling in the skin of the hands and fingers. These symptoms continued for seven days after taking the milk. On the ninth day vesicles had formed on the tongue, principally on the edges, and on the mucous membrane of the cheeks and lips (the largest being about the size of a lentil). They were yellowish-white in colour, and contained a whitish turbid liquid, which flowed when the vesicles were pricked with a needle. At the same time a number of vesicles developed

on the hands and fingers; the greater part of them at the time of their first appearance were the size of a millet-seed. They were firm to the touch, yellowish-white, and occasioned a slight tingling. The vesicles of the mouth increased in size and broke, and the epithelium detached itself completely from the affected parts, leaving dark red spots, which disappeared gradually. The slight fever present during the first days ceased after the appearance of the eruption; but counting from this date to the disappearance of the red spots, Hertwig felt a continual burning pain in the mouth, and speaking and deglutition caused considerable uneasiness. On the lips the vesicles dried up, and were covered with thin brownish crusts, which fell off ten days after the appearance of the first vesicles. The vesicles which developed on the hands ran a slower course. From the tenth to the thirteenth day they filled with a liquid, like turbid lymph. They were large and confluent, and finally broke and dried up.

Glanders is a malignant, contagious, and fatal disease, occurring in the horse, ass, and mule, and occasionally communicated to man. The disease spreads very rapidly among horses, and those persons who are in contact with them are liable to be infected. I have nothing to add to the descriptions given by the many writers on the subject, so that I need not make further reference to it, except to remind you that Glanders undergoes no modification when communicated from animal to man, and back again from man to animal, such as is commonly believed to occur in the case of Small-pox and Cow-pox.

Anthrax is a disease affecting cattle, sheep, and horses. To these I must add swine. Toussaint in France is responsible for the doctrine that swine are insusceptible, an opinion also maintained by Klein. During the past year I have made a series of researches, which have established the fact that Anthrax can be communicated to pigs, both young and old.

The disease is also communicable to man. Most frequently it results from inoculation of some lesion or abrasion of the skin. Hence it is by no means uncommon in butchers who have been dressing an animal which has died from Anthrax, or in veterinary surgeons who have been making a *post-mortem*. In such cases the disease is more or less local. In one case brought to my notice, a veterinary surgeon made a *post-mortem* upon the body of a bullock that had died the night previously. The spleen and parts of the viscera were forwarded to me for examination. The blood from the spleen was full of the characteristic bacilli. As I was informed that the veterinary surgeon had inoculated his finger, I wrote for particulars, and ascertained that the bullock had been found dead in a meadow near a river. After making a *post-mortem*, Mr. A——

wiped the blood off his hands with some rough grass, which cut the skin on the inner side of the third finger. The hand was well washed in the river, and a strong solution of carbolic acid applied. On the following night there was a tingling sensation in the finger, and the next day it became considerably inflamed, and a distinct pustule had formed, with several smaller pustules surrounding the larger one. Mr. A—— became restless, and at times partly delirious, and if he attempted to sleep these feelings were much intensified. He also suffered from great mental depression, which continued during the attack. On the fourth day he lanced the pustules and let out the contents. The finger was much swollen, hard, and extremely painful, and the lymphatics of the arm were inflamed. On the sixth day a medical man was called in and caustic applied. The disease progressed, the pustule increased in size, and on the twelfth day the finger had become black, cold, and much swollen, and the pain greatly intensified. A surgeon was called in and the finger amputated; the pain then subsided, the inflammation of the lymphatics began to disappear, and he gradually recovered.

In another well-known mode of infection the disease is general, as in wool-sorter's disease, and frequently leads to fatal results. In this case the spores of the bacilli are present in the wool or the hair of animals that have died from Anthrax.

I will now pass on to say a few words with regard to my second group. This comprises communicable diseases in man, which in some cases may *possibly* be derived from similar diseases in the lower animals. Such cases are illustrated by Tuberculosis and Actinomycosis.

Tuberculosis is extremely common in cattle and poultry, and also affects pigs, and more rarely horses and other animals. As numbers of cattle slaughtered for the market are tubercular, and as cows with tubercular udders are occasionally found in dairies, it becomes a serious question whether human Tuberculosis may not in some cases arise from the consumption of meat and milk containing the virus of bovine Tuberculosis. Animals, such as pigs, rabbits, and fowls, if fed on tubercular material, rapidly become infected. Is it possible that the flesh of tuberculous animals may infect man? We can only say that direct evidence of the communication by such means to man of bovine Tuberculosis is at present wanting. This may be owing to the fact that as meat is cooked, the virus is destroyed. But if it is possible for this transmission to occur through uncooked material, it would naturally be expected that bovine Tuberculosis would be conveyed by milk, which, as Bang has pointed out, is seldom boiled. The possibility of this source of tuber-

cular infection has been especially brought forward of late by the researches of Bang, and following in his footsteps, by Woodhead and McFadyean. The milk of cows, with Tuberculosis of the udder, contains tubercle bacilli, and such milk given, either by the mouth or subcutaneously, to other animals produces Tuberculosis. Woodhead and McFadyean found, in the course of their examination of a large number of dairies and cow-sheds, in one herd no less than three cows suffering from what they supposed to be Tuberculosis of the udder. In order to obtain some accurate data, they made a systematic examination of some of the cow-houses in Edinburgh. On six occasions they were able to examine 623 cows, kept by thirty-seven dairy-farmers. In fifteen of these dairies they found the whole of the stock healthy. Amongst the others were thirty-seven beasts, in which there were more or less marked changes in the udder, and in six cases they were able to demonstrate the presence of tubercle bacilli.

I have had the opportunity of examining two cases of udder Tuberculosis, and have been able to confirm the observations of these and other investigators with regard to the presence of tubercle bacilli in the milk. This milk, when administered with other food, produced in rabbits tubercular ulceration of the intestines and Tuberculosis of the mesenteric glands. I found that in such cases the bacilli could be more readily demonstrated by collecting the milk in test-tubes, and setting them aside for a few hours. The milk is then carefully poured away, and the sediment at the bottom of the tube spread on a cover-glass, and stained in the ordinary way.

In both these cases the milk had been mixed with the general supply of the dairy. There is thus ample evidence that the milk of tuberculous cows finds its way into the market, but what evidence is there of its producing Tuberculosis in the human subject? If such did occur, primary Tuberculosis of the intestines, might well be expected to be a common affection, but such we know is not the case in the adult. This would, therefore, tend to contra-indicate danger to the adult, but on the other hand, Woodhead has emphasised the probable danger to children. Woodhead has pointed out that from his experience in two large hospitals he has been much struck by the fact that in children who had succumbed to other diseases during the course of tubercular disease of the abdominal glands there was frequently not any trace of tubercular disease in other parts, thus pointing to the intestine as the channel by which the bacillus made its way into the body. Woodhead also remarks that in a large number of cases of general Tuberculosis, where the possibility of

infection by the pulmonary passages was evidently excluded, the tubercular process appeared to have invaded the body by the intestinal canal.

From these observations we may safely conclude that there may be danger in using the meat and milk of tuberculous animals for food, and therefore such meat ought to be rejected from the market, while strict inspection of dairies and boiling of milk before use will be wise, if not absolutely necessary precautions.

The next disease of which I wish to speak may be classed with Tuberculosis, in that it is quite possible that it may be transmitted from the cow to man, but it must be admitted that the evidence in favour of this belief is not nearly so strong as in the case of Tuberculosis.

Actinomycosis.—This is a disease of cattle which has long been reported on the Continent as a common disease, but until somewhat recently in this country it was only regarded as of occasional occurrence, affecting the jaws and tongue, and rarely the nostril and pharynx. My attention has been drawn to this disease for some years, but I will only briefly refer to some facts which I have experienced during the past year. In June, 1887, I had the opportunity of examining a black heifer, three years old, with a large growth in the parotid region. This tumour was discharging in places, and on firm pressure a quantity of yellowish muco-purulent matter was squeezed out, and collected in test-tubes. The case was reported to be one of several affected with the same disease. On spreading some of the discharge in a film on a slide, I observed the little grains which to the naked eye recalled the appearance of Actinomycosis, and on covering with a cover-glass, and examining first with a low and then a high power, the characteristic tufts and club-shaped structures were revealed. The animal was killed, and a section through the growth revealed the characteristic naked-eye appearances of an enormous actinomycoma. But in addition there were several large tumours extending along the trachea, one the size of an orange, and scattered through the lungs were smaller growths, varying in size from a millet-seed to a walnut. Sections of the lung proved that these neoplasms were also the result of Actinomycosis. This case had been sent from Norfolk, and as it was reported that there were several cases on the same farm, I obtained permission to inspect the farm and make inquiries. I found that the animals were suffering with growths in various regions—face, neck, flank, and—scrotum and that these tumours were known by the farmers as wens, stickfasts, and sore-faces. I was informed that the disease was very prevalent in the "fenland," that the

same disease had occurred on some neighbouring farms, and that it was well known to the oldest cowman on the estate. Further inquiries were set on foot, and I have been supplied with a large number of cases from this and other parts of the country, while quite recently I have been investigating two outbreaks of Actinomycosis where the disease has somewhat suddenly appeared in a considerable number of animals. There is no doubt, then, that in this country Actinomycosis is extremely common, and that it is particularly prevalent in certain low-lying districts. If, then, the affection is communicable to man, and bears any relation in frequency to the cases in cattle, numerous cases must have been overlooked by the pathologist, for only a few cases of a disease described as Actinomycosis in man have been published in this country. The existence of such a disease in man is now well established, and Continental observers have placed nearly 100 cases on record. But out of 75 cases collected by Moosbrugger, only ten individuals were farmers, peasants, or farm-labourers, and two only were in direct contact with cattle. And in connection with this, we must bear in mind that the micro-organism associated with the disease in cattle differs in details from the micro-organism in the disease in man. These differences are very marked, but they may possibly be accounted for as the result of the same micro-organism growing under different conditions of soil. On the other hand, in the present state of our knowledge it may be urged with equal force that though similar in some respects, we are in reality dealing with two distinct micro-parasitic affections, which occur quite independently of each other.

Lastly, I will refer to my third group, comprising a number of diseases which have been alleged to have their origin in diseases of the lower animals. The theory of the animal origin of the specific poisons of infectious fevers in man has been brought prominently forward in the alleged origin of Scarlet Fever from a disease of the cow, and this has been discussed with so much gravity that many have been led to suppose that it is an entirely new idea, which may revolutionise our knowledge of the pathology and preventive treatment of these diseases. I shall endeavour to show you that the theory dates back to the earliest history of medicine, and that it has been revived from time to time, only to be refuted and relegated to the domain of exploded ideas. We first hear of it in connection with the origin of small-pox.

Small-pox, we are told, was attributed by the Arabians to a disease of the camel, and this belief was regarded as an argument in favour of its origin from the lower animals when Jenner pro-

mulgated a similar idea. But Jenner, as I have pointed out in the quotation from his work on Cow-pox, substituted the horse for the camel. He considered it probable that Small-pox in man arose from morbid matter of a peculiar kind, generated by horses suffering with "greasy" hocks, and thus reasons: "May not accidental circumstances have again and again arisen, still working new changes upon it, until it has acquired the contagious and malignant form under which we now commonly see it making its devastations among us? and from a consideration of the change which the infectious matter undergoes from producing a disease in the cow, may we not conceive that many contagious diseases now prevalent amongst us may owe their present appearance, not to a simple, but a compound origin? For example, is it difficult to imagine that Measles, Scarlet Fever, ulcerated sore-throats, and spotted skin all spring from the same source, assuming some variety in their forms according to the nature of their new combinations?" Baron informs us that this idea was prevalent in Jenner's mind as early as 1787. It is related that in that year he accompanied his nephew, George Jenner, into a stable to look at a horse with diseased heels, and pointing to them, he remarked, "There is the source of Small-pox. I have much to say on that subject, which I hope in due time to give to the world." And again in 1794, in writing to a friend in connection with this subject, he adds, "Domestication of animals has certainly provided a prolific source of diseases among man. But I must not anticipate; you shall have a paper."

Jenner's views have not found favour. It has been shown by Loy and others that the Grease bears no relation to Cow-pox, and it is now generally believed that Jenner mistook a vesiculo-pustular disease, the same disease in the horse as Cow-pox in the cow, for the disease known as the Grease. This vesiculo-pustular disease of the horse, previously described by veterinarians under various names, is now called Horse-pox. Who is there at the present day who can bring evidence to support the theory of Small-pox in man arising from any disease of the horse? Indeed, the origin of Small-pox from a disease of the horse was not upheld even by Jenner's pupil and nephew, Henry Jenner. The latter promulgated the idea that Small-pox originated from the cow. He believed that Small-pox, in fact, was Cow-pox *intensified in its virulence by being passed through man.* He thus expressed himself: "Nor may it, perhaps, be too hypothetical to suppose that the Cow-pox may possibly be the Small-pox in its original unadulterated state, before it became contaminated by passing through the impure and scrofulous habits of human constitutions." It will be observed that this theory is the reverse of the doctrine

of the present day, which is that Cow-pox is human Small-pox *mitigated by being transferred to the teats of the cow.* However, this theory of the origin of the specific febrile diseases was not allowed to rest; another infectious fever in man was stated to have its origin in a disease of the horse.

Scarlet Fever.—Dr. Copland, in his "Medical Dictionary," states that Scarlet Fever in man was originally a disease of the horse, and that it formerly occurred, and has recently occurred, epidemically as an epizootic amongst horses; secondly, that it was communicated in comparatively modern times from horses to man; thirdly, that it may be, and has been, communicated to the dog. But this opinion has not been accepted, for the disease known as Scarlatina in the horse is described as a non-infectious disease, generally attacking but one or two horses in a large stud. It neither spreads by contagion nor infection; and Williams states that it is impossible to transmit it from the horse to any other animal, and that many cases of the so-called Scarlatina of the horse are in reality identical with Purpura.

And now, comparatively recently, the theory has again been revived, and finally has been adopted by Dr. Buchanan and the Medical Department of the Local Government Board. Owing to failure in finding, in some cases of milk-scarlatina, contamination of the milk from a human source, the belief has grown that in such cases the disease may be derived from the cow; that, in in other words, there is a disease, Scarlet Fever in the cow, which is responsible for outbreaks of Scarlet Fever in man.

In 1882, an epidemic of Scarlatina in St. Giles and St. Pancras was investigated by Mr. Power for the Board. The disease was distributed with a milk supply from a Surrey farm. In this case two facts were ascertained—the one that a cow recently come into milk had been suffering from some ailment from the time of her parturition, of which loss of hair in patches was the most conspicuous manifestation; the other that there existed no discoverable means by which the milk could have received infective quality from the human subject.

In 1885, another outbreak of Scarlet Fever occurred in connection with milk from a farm at Hendon, and again Mr. Power failed to establish infection from any human source in any commonly accepted way—such, for example, as handling of milk, or milk utensils, by persons carrying Scarlatina infection. But on examining the cows with a view to ascertaining any new condition pertaining to them, it came to light during the inquiry that some of them, which had recently been introduced from Derbyshire, were suffering from a vesicular disease of the teats. Dr. Cameron reported on the clinical history of the disease, which was com-

municable to the hands of milkers, while Dr. Klein brought forward pathological evidence to support the theory of bovine Scarlatina. Dr. Klein found a streptococcus in the discharge of the ulcers on the teats, and in some of the cows he found lesions which were alleged to recall the lesions of Scarlet Fever. A similar streptococcus was found in certain cases of Scarlet Fever in man, and the microbes from either source, when inoculated *en masse*, produced similar lesions in calves. It was therefore concluded that the Hendon Cow Disease was Scarlet Fever in the cow, and that Scarlet Fever in man originated from the consumption of the milk of cows suffering from this disease. Now, so far as the pathological evidence goes, I have pointed out, in my papers read before the Pathological Society of London, that these data admit of an entirely different interpretation. The *post-mortem* lesions were those of septic complication, and common therefore to many diseases, and the streptococcus is a septic micro-organism occurring as a secondary result in many affections besides Scarlet Fever. Inasmuch as the streptococcus and the septic discharge from ulcers produced on inoculation in cows certain *post-mortem* appearances, which are common to many diseases, and failed to produce fever, ulceration of the tonsils, or scarlatinal rash, or any condition in the least resembling clinically the disease in man, the conclusion that the result was Scarlatina in the cow was quite unjustifiable; and if you take the trouble to study the description of the clinical history of the disease by Dr. Cameron, and the *local* result obtained by Dr. Klein after inoculating calves with septic lymph from the cows' teats, resulting in spurious vaccination, you will fully understand the arguments which I have brought forward in support of the opinion held at the Hendon farm that the disease was, in reality, Cow-pox—an opinion strengthened by the complete correspondence with an outbreak of Cow-pox in Wiltshire, the account of which I shall shortly publish in full. That this disease was merely coincident with the contamination of the milk, is borne out by the fact that at the same time the same cow disease was introduced from the same herd into other farms, where it was communicated in the same way to the healthy cows and to the hands of the milkers, and yet the milk supplied from these cows was freely consumed without producing any Scarlet Fever.

Diphtheria has also been supposed to arise from diseases of the lower animals. Dr. Cameron, after giving his account of the Hendon Cow Disease, says: "I am not assuming that this cow malady, under discussion, is capable of causing in the human subject any other disease than Scarlet Fever, but I regard it as

helping to throw some light upon the natural history of Diphtheria. Indeed, there may be an as yet undiscovered disease, perhaps without much skin eruption, and without conspicuous disease of the teats or udder, and probably also of a trivial nature in the cow, with symptoms somewhat different from those of Diphtheria in man, which is capable of causing this disease in human beings through the medium of the milk from such cows. At the same time, it is possible that Diphtheria may be caused by some modification of this particular malady."

Dr. Turner has also suggested the origin of Diphtheria in man from certain diseases simulating Diphtheria in cats, pigs, and horses. I need add nothing to these descriptions, which, indeed, speak for themselves as to their purely hypothetical character, and I fear that they have been brought forward owing to a tendency to pursue fanciful theories which are liable to conceal our ignorance on the subject of the origin of these diseases, and regardless of the damaging result of their application by a public only too apt to listen to the voice of alarmists. I have endeavoured to lay before you the dangers, real and imaginary, with regard to the transmission of some of the diseases of the lower animals to man, and to place both sides of the question before you. I would have you sift the evidence carefully before you formulate conclusions, and above all not be too ready to blame the sister profession if your conclusions are not accepted. On the contrary, when we consider that Small-pox has been asserted to arise (*a*) from a disease of the camel; (*b*) from grease in the heels of the horse; (*c*) from vesicles on the cows' teats; and that Scarlet Fever has been asserted to arise (*a*) from purpura in the horse; (*b*) after parturition in the cow; (*c*) from vesicles on the cows' teats; and that Diphtheria has been supposed to arise (*a*) from garget or mammary abscess; (*b*) from a disease like Cow-pox; (*c*) from a disease in the cow without conspicuous eruption; (*d*) from a disease in the cow without any conspicuous symptoms; (*e*) from diseases of cats, pigs, and horses, simulating Diphtheria, I think that pathologists will rather sympathise with any apathy that may be displayed by the veterinary profession in listening to the opinion of the theorists of our own.

THE BILHARZIA HÆMATOBIA.

BY JOSHUA A. NUNN, F.R.C.V.S., F.R.G.S., ARMY VETERINARY DEPARTMENT.

ALTHOUGH the bilharzia is chiefly of importance to the practitioner of human medicine, still the following remarks may perhaps be of some interest to the veterinary profession, especially as, according

to Cobbold, it was discovered by Sonsino in the ox and sheep, and this fact must be my apology for bringing the following remarks to notice. The parasite has been known for some time past, having been first noticed in Egypt by Bilhary in 1851, and in 1864 in Natal and the Cape of Good Hope by other observers, where it is the cause of a form of endemic Hæmaturia in man; and although only recognised in Egypt and the Cape, it is exceedingly probable that it exists elsewhere on the African continent.

The case from which I had an opportunity of studying the parasite, was an aggravated one in a soldier of the 6th Dragoons, who had been quartered at Pine Town, a station midway between Pietermaritzburg and Durban. The mature parasite is unisexual, *i.e.*, male and female, the ova truncated and fluke-shaped, contained in a shell about $\frac{1}{180}$ to $\frac{1}{160}$ of an inch long by $\frac{1}{325}$ wide, according to Cobbold, page 40. The ova is easily (and the mature parasite sometimes) discovered by taking a small portion of urine, placing it in a test-tube, allowing the blood and solid matter to settle, which they will do in about half an hour, and then decanting off the clear fluid, only about a quarter of an inch being left above the sediment at the bottom. The tube then should be shaken, and a small quantity of the mingled fluid removed by a glass pipette and placed on a slide under a cover-glass. As it evaporates the water can be renewed by a drop placed on the edge of the cover-glass, and in this way I have kept specimens under observation for many hours at a time. I observed when the urine was allowed to stand some time, and the blood to clot, that the fluke-shaped ova were altogether found in the blood, few, if any, in the clear fluid at the top of the tube. If the specimen is examined without the addition of water, it is sometimes difficult to distinguish the ova amongst the blood corpuscles, especially if there is much epithelium present. The ova will take any of the ordinary aniline stains, methyle blue, Spiller's purple, gentian violet, etc., but I found that they shrivelled up when passed through the flame of the spirit-lamp in this process of staining. I found that when a cover-glass film was made and dried in the sun, not in a flame, that the ova could be stained by Ranvier's purocarmine solution, a few drops being placed on to the film on the cover-glass with a pipette, left there for five minutes, then removed with blotting-paper, the cover-glass dried in the sun, and mounted in the ordinary way in Farrant's medium. The surrounding fluid, blood corpuscles, etc., are stained red, the egg-shell a darker red, and the parasite inside the egg-shell a vivid yellow. Left standing in the urine, I found after about the second to the third day the parasites began to move inside the egg-shells, making violent efforts to escape, twisting themselves round and reversing

their position inside the shells. These movements were kept up some considerable time, until the shell of the egg ruptured and allowed the escape of the parasite, which moved across the field of the microscope with great rapidity, apparently swimming with the aid of the cilia with which it is furnished. In most specimens the cilia look at first sight to be nearly round, the edges like the fins of a flat fish, but careful examination will show that they cover the entire body. Some of the parasites do not escape from the shell at once, as it appears to be too thick and to resist their efforts. In this case the body of the parasite appears to undergo a metamorphosis into a number of globules. In several specimens I thought I could detect cilia round these globules, though not invariably so; but perhaps future investigation will prove if this is the case or not. After about the seventh or eighth day the egg-shell bursts, the globules break down into granules, which escape through the rent in the shell. These globules congregate together in masses; placed on a slide in a drop of distilled water, and lightly covered with a thin cover-glass, these globules will be seen to possess a rotary motion, revolving both on their own axis and in a small orbit three or four times their breadth in diameter. This is more particularly noticeable in those globules at the edge of the mass. If the mass is broken up, and the medium in which it is contained set in motion by pressing with a needle-point on the cover-glass, the addition of a drop of water to the edge by a pipette, by tilting the microscope slightly to one side or by slightly shaking the table, they will be seen carried away by the current, but still revolving. Where a scale of epithelium, a congregated mass of blood corpuscles, or any other obstruction breaks the current, some of these globules will be seen under the lee of it in the slack water, still revolving and moving up against the current. These globules, about the second to the fourth day after the egg-shell has burst, begin to elongate into rod-shaped embryos, which can be seen moving through the fluid in a wriggling fashion with great rapidity. One end of these rods is of a brighter colour than the other, and appears to be a head. These embryos do not appear to undergo any further change, and to exist a long time; some I kept in distilled water for twenty-eight days. The larva that escapes from its shell naturally, if I may use the expression, also undergoes segmentation, only outside instead of inside the shell. They can be artificially liberated by pressing on the cover-glass with a needle-point and breaking the egg-shell, which seems to be possessed of considerable powers of resistance, the needle-point having to be pressed with a considerable amount of force before the egg-shell is ruptured. The larva assumes various

shapes, and appears to have the power of contraction when making its exit through the fissure in the egg-shell. If this is too small the larva often appears to become fixed into the rent in the shell, when it makes violent efforts to escape, turning about in a variety of contortions. When free they swim with great rapidity at first, but the motion gets gradually slower till they stop altogether, and this they do much sooner if there are obstructions, such as blood corpuscles forming bands, than if the medium is water. When they stop swimming they still keep up an active movement with their cilia for some time, but this gradually ceases also. In the majority in which I have observed this movement, the stoppage commences from the tail, gradually extending forward to he head. If they are observed in urine in which there are any considerable number of blood corpuscles, this movement is very well seen by their displacement. It is, I believe, a disputed point whether the disease is caused by the drinking-water, or if it is local, the parasite gaining access to the bladder by the urethra when bathing; but bearing in mind the development of the *Cœnuris cerebralis* of the sheep and the *Filaria oculii* of the horse, which although they gain access to the system by the stomach, only develop in the brain and eye, it is not possible that the bilharzia taken in in the drinking-water only develops when it reaches the bladder. What may be the further development of the parasite to complete the cycle is, as far as I am aware, unknown, but the probabilities are that it finds an intermediate host in the form of some not common water-insect. This is more probable if the enormous reproduction of the parasite is considered; for unless some natural check were interposed to its increase, almost every human being in South Africa would be suffering from it.

SPASMODIC ASTHMA.

BY HENRY GRAY, M.R.C.V.S., LONDON.

As the existence of Spasmodic Asthma in the horse has often been denied, or has been confounded with "Broken Wind" or Spasm of the Diaphragm, I think the following case is interesting and worthy of record:—

On October 20th, 1888, a brown cart mare, aged eight years, was brought to our infirmary. She was in poor condition, and had been working very hard. It appears that she came home from a journey at 1.30 a.m., and nothing amiss was noticed by the horsekeeper when he left her for the night. At 6 a.m., when he went to his stable, he found her "blowing tremendously." We saw her at 8 a.m., after being brought from a distance of about

half a mile. The nostrils were widely distended at every inspiration, and having a peculiar flapping action, the angles of the mouth being drawn up also at every inspiration and opening during and after the act of coughing. There was a peculiar flapping of the abdominal muscles, the muscles of the floor of the abdomen being drawn up spasmodically towards the loins during every expiration. Respirations 80, and not noisy. The chest walls did not move freely. The cough was paroxysmal, long, loud, and ringing; after coughing there was a quantity of frothy spume expelled *per oram et nares*. There was no grunting; no pain expressed on percussing the chest or on turning or exerting the animal. Bowels, etc., natural. The body and extremities warm and dry. She did not have a painful appearance, and she was very spiteful to other horses when they passed her. Pulse seemed full and rather hard. Partook of water freely. A frothy sound could be heard when the trachea passed into the chest. She has had three similar but slighter attacks, and at various times the respirations were noticed to be affected. Ext. Belladonna ʒss was administered. The owner came to see her at 6 p.m., and so distressing was her appearance to him that he wished to have her destroyed. By our advice he consented to allow her to live until morning, and if no better, then he would have her killed. Æther. Sulph. fl. ʒij was given in oil. At 9 p.m. Æther fl. ʒvj was injected hypodermically into the breast, and she was left for the night, the owner quite expecting to hear of her death in the morning.

Next morning the respirations were natural, and she appeared lively and partook of her usual food. She was sent home, and no further treatment was pursued.

I have seen several cases similar to the above, some of the animals being affected several times. It is frequently seen in old fat cobs and horses of the lymphatic temperament. It is liable to run on to "Broken Wind."

A SINGULAR CASE OF MARE-FOALING.

BY A. W. LAWSON, M.R.C.V.S., FALKIRK.

On the afternoon of the 11th May last I was called upon by Mr. Grindly, farmer, Bonnybridge, near Falkirk, requesting my services upon a grey cart mare labouring under difficult parturition.

On making inquiries as to how long she had been ill, etc., and if at the proper time, he informed me that she commenced to foal at 1 a.m. on the 9th, "nearly three days," and had been trying ever since, but couldn't. Her time of foaling was duly correct.

History of Case.

In from two to three hours from the commencement of foaling, there being no progress, and thinking something wrong, he sent for his veterinary surgeon, who in course of time arrived at the farm. After examining the mare, he assured his client that she would foal all right, just to give her time, and that he would call again in the evening (the mare at this time was labouring severely).

He called same night, and found matters as he had left them, and left them again as he found them, the mare continuing her efforts to relieve herself, but to no purpose.

Thursday morning he found one foot protruding *per vulva*; still maintained that she would foal all right, "of her own accord." Would call again in the evening. In the interim she was ordered exercise, yoked in a cart, but this very wisely was not done. At night he found her no further advanced. Friday morning the same, but naturally to suppose, much exhausted.

Doubtless it will sound rather funny in the ears of your numerous readers, when I state that during the two and a half days of that gentleman's attendance he never once examined the mare *per vagina*, in order to ascertain what was the cause of retention; but perhaps *humanum est errare*. We all do so at times, yet under similar circumstances I hardly think so obviously.

It is not very pleasant to be called in apparently *in articulo mortis*, especially so when one considers the case neglected; so it was with a feeling of reluctance that I went, being sanguine of a fatal termination.

Having arrived at the farm, I found the mare in a most prostrate and exhausted condition, swaying from side to side, with legs astride, body covered with cold perspiration, extremities and ears cold, pulse almost imperceptible, "impossible to take it," nostrils distended, listless expression of countenance, one foot of the fœtus protruding *per vulva*.

I next proceeded to explore matters *in utero*, which examination revealed the following abnormal presentation: head directed downwards and backwards underneath the chest, the other leg turned backwards along the abdomen. Manipulation was a hard task, from the fact of the fœtus being very much enlarged through emphysematous swelling. Having got matters rectified and in position, with plenty assistance to pull, progress was visible, when all of a sudden one half of the body came away, the trunk giving way, leaving the other half in the mare. I as soon as possible secured the hind legs of the remaining half, and got it away also. Thus all was away. My next duty was to attend to the wants of the mare, which seemed a hopeless case, being more dead than alive.

A consideration in our patients is the exhibition of agent's "expense" where hope of success is almost beyond anticipation. However, under the circumstances, I was determined to leave no stone unturned.

I administered a strong diffusible stimulant, with a febrifuge and antiseptic, syringed the uterus thoroughly out with warm antiseptic solutions, removing all morbid products, fluids, etc., then dressed the whole of its lining membrane with antiseptic liniment. Had her well rubbed, dry and warm rugs applied, bandages to legs. Ordered the medicine "as above" to be given every three hours, likewise the injections *in utero*, until further instructed, with light warm mashes and gruel drinks, etc., occasionally, not neglecting external comfort. For four days her condition was critical, after which slight improvement was obvious. Prescribed stimulating tonics, with still the antiseptics and the injections. As convalescence became more manifest I combined the above with mineral tonics.

She made an excellent recovery, when in about two to three weeks I sent her to grass.

Remarks.

There was nothing unusual in the form of presentation, and had assistance been rendered at the proper time a living foal might have been born. In fact, had the malpresentation been reduced she could have foaled herself. Her labour was strong, but it gradually became inert from exhaustion. The uniqueness of the case consists in the mare holding out so long, nearly three days, straining and labouring while her strength permitted, and eventually pulling through. The fœtus, when taken away, was literally rotten.

Editorial.

THE TRIUMPH OF PASTEURISM.

THE opening of the Pasteur Institute in Paris, forms a marked event in the history of micro-biology, and a real triumph for Pasteur. It might almost be considered the crowning victory of his life, did we not know that he is still labouring, notwithstanding serious infirmities, in the cause of science, and particularly in that branch of it to which, in recent years, he has entirely devoted himself. His victory now consists in having founded a special institution for the study of those maladies of organised beings, which are due more or less to microbes; this establishment being liberally endowed, and provided with competent investigators, and every appliance necessary for the great and important work yet to be achieved in this direction. The ceremony attending the opening of the Institute, and the notabilities present, was in every way worthy of the occasion, and we need not wonder at the emotion Pasteur displayed, or the feelings of pride and gratitude which moved him, when we reflect what he has been able to accomplish for the benefit of mankind, and the grand sum total of this laid briefly before him and the assemblage by the various speakers. The almost insuperable obstacles he has overcome—not the least being those raised by jealous rivals, incredulous amateurs, or persons hostile to science—and the manner in which he has overcome them, form a most enthralling chapter in the history of science.

Every year adds to the splendid edifice of micro-biology which Pasteur has founded, and to which he and others are continually adding; and we cannot doubt that, having now completed all arrangements for a more vigorous and complete course of research, great benefits will be incessantly conferred upon mankind by the work done in his new laboratories. France now stands far ahead of every other country in the encouragement she gives to science, and though investigators of the Pasteur type cannot be created by State intervention—for, like the poets, they are born, not made—yet the State can aid and encourage them in their mission, which, but for this countenance, might be only imperfectly fulfilled. All men who love science and admire scientific work, especially that which tends to benefit mankind and animals, will award their congratulations to one of its most illustrious representatives, M. Pasteur, on the signal progress he has made in developing the particular branch of human knowledge with which his fame will be always intimately associated, and will earnestly hope that his life may be long spared to preside over the institution which bears his honoured name.

ON THE USE OF THE TAPETUM LUCIDUM.

BY HENRY LEE, F.R.C.S., CONSULTING SURGEON TO ST. GEORGE'S HOSPITAL, LONDON.

AT the inquest held on the body of the woman lately murdered in Berner-street, Whitechapel, it was given in evidence that the horse of the man who discovered the body refused to pass it. The man dismounted, and only after feeling about with the handle of his whip made it out. The horse could see

it when the man could not. This is only one of a very great number of instances which might be given to prove that the horse, and other animals which have the tapetum lucidum, can see where a man cannot.

The ordinary diagrams illustrating the action of light upon the retina in the shape of a small inverted arrow might lead to the impression that light entered the eye so as to fall upon the retina only from the immediate neighbourhood of the object looked at. This is not so; for although one part of the retina is used habitually for accurate vision, yet some vision takes place in other parts.

Standing in the middle of a moderate-sized room and looking at the centre of one of the walls, the observer will see that part distinctly, but he will also see less distinctly nearly all the other parts of the wall. A sportsman going into a field and having his eyes fixed upon an opposite stile will see anything moving in any part of the field. The less sensitive parts of the retina act as the finder does in a large telescope. It affords information as to the point to which the visual axis is to be directed. In the "Phil. Trans.," vol. xci., p. 46, Dr. Young observes: "The visual axis being fixed in any direction, I can at the same time see a luminous object placed laterally at a considerable distance from it, but in various directions the angle is very different. Upwards it extends to 50°, inwards to 60°, downwards to 70°, and outwards to 90°. Thus the rays of light which enter the human eye come from a very considerable area, but when they have once passed through the retina they are absorbed by the black pigment of the choroid. Many animals, notably the horse, the ox, and the sheep, have very much larger pupils than man, and consequently the amount of light from any fixed point which enters the eye is greater, and the area from which the light is derived is also greater: in them all the light which falls upon the tapetum is reflected as from a slightly concave mirror, and brought to a focus in front of the eye. If the eye were perfectly circular, any light reflected from its posterior part would come to a focus in the middle of the eye, but the back of the eyeball is only slightly concave in front. This concavity varies with the shape of the eyeball, and consequently any change in the focal length of the eye will alter the distance at which the reflected and converging rays meet. Therefore, inasmuch as the muscles of the eyeball have the power of altering its focal length, in the same degree have they the power of determining the distance at which the rays reflected from the tapetum will come to a focus in front of the eye."*

If the eye of a sheep or an ox be frozen so that its shape cannot be altered, and the optic nerve be cut close off, it will lay almost flat upon its back. There will be about the same amount of convexity of its external surface as there is in a frontal laryngoscope. The difference in shape of the anterior and posterior parts of the eye is in this respect very remarkable. The comparatively flat surface of the posterior part is exactly adapted to the reflection of light from the tapetum which accurately lines it.

Converging rays of light reflected from the tapetum come to a kind of focus in front of the eye at different distances in different animals and in the same animal at different times in accordance with the alteration of the antero-posterior diameter of the eye. But although there is one point in the visual axis where the rays of light are particularly concentrated, yet the visual axis may be more or less illuminated for an indefinite distance. The rays of light, after meeting at the focal distance in front of the eye, again diverge, and throw some light beyond the object immediately looked at.

The use of the tapetum differs in different animals. In the sheep and the ox it is used for grazing purposes principally. In the antelope and horse it

* "On the Tapetum." Churchill.

enables them to see in the dim twilight where they are about to tread. In the cat and dog the reflected light is thrown farther forwards, and enables them to judge accurately of the distance of their prey, and in the giraffe it is used for browsing. It is a curious fact that all the specimens of the tapetum in the museum of the College of Surgeons with one exception are put upside down. When this was done the use of the tapetum could not have been known.

Artificial light, unless properly used, may interfere with the use of the natural reflectors of the eye—the glare of the greater light may obscure the lesser.

In the published accounts of an accident to Her Majesty in Scotland it is stated that Mr. John Brown sat on the box of the carriage and threw the light from the lantern directly between the horses' heads. The light under these circumstances would be thrown some yards in front of the horses, and their bodies would prevent any light being thrown in front of their feet. It is here that their natural reflectors would throw it. The glare of a greater light in front would prevent their seeing what was immediately before them, as they otherwise would. As far as the horses are concerned, if an artificial light be used, it ought to fall in front of the horses' feet or between the near horse and the pavement in town and the ditch in the country.

Another use may be assigned to the tapetum. It may not only enable animals feeding to see any foreign matter that might be accidentally mixed with their food, but the glare from the tapetum might also be seen by any living creatures that might be in danger of being taken up with it. A snake, a frog, or a mouse seeing this reflected light would be warned and have time to escape.—*Medical Press.*

ON THE TRANSMISSIBILITY OF COLOUR IN HORSES.*

BY DR. WILCKENS, VIENNA.

1. *English Thoroughbreds.*—Parents of *similar colour* transmit to their offspring their own particular colour in the following degree. In 1,000 matings, 856 times. In *colour-crossing* 1,000 matings produce 437 foals the colour of the stallion, and 508 that of the mare, with 55 of various colours. In animals where colour has been *bred pure for generations* chestnut is transmitted to the offspring to the greatest extent, in 1,000 matings 976 times. In *colour-crossing*, brown, in 1,000 matings where the stallion has been brown, the colour has been reproduced 529 times; in 1,000 matings where the mare has been brown, 615 times. Black is reproduced to the least extent in colour-crossing; in 1,000 matings, black stallions, 116 times; 1,000 matings, black mares, 92 times.

2. *English half-breds* transmit, in 1,000 matings of *like-coloured parents*, 873 times their own colour. By *colour-crossing*, 1,000 matings transmit to 367 foals the colour of the stallion, and to 555 the colour of the mare, and to 78 various colours. In animals *bred pure to colour* for generations, chestnut is here again reproduced in highest degree, in 1,000 matings 946 times. In *colour-crossing*, brown stands highest; in 1,000 matings, brown stallions, 554 times; in 1,000 matings, brown mares, 708 times. Black, again, is the most rarely reproduced in colour-crossing—in 1,000 matings, black stallions, only 132 times; in 1,000 matings, black mares, 210 times.

3. *Arabs, pure and half-breds*, transmit in 1,000 matings of *like-coloured parents* 837 times their own colour. By *colour-crossing*, in 1,000 matings, 313 foals the colour of the stallion, 566 the colour of the mare, and 121 of

* Translated from the *Austrian Agricultural Year Book* by E. E. Bennett, F.R.C.V.S., M.R.A.S.E.

various colours. In animals *bred pure to colour* for generations, grey is reproduced in greatest degree, in 1,000 matings 900 times. By *colour-crossing* grey also heads the list; in 1,000 matings, grey mares, 729 times; then brown, in 1,000 matings, brown mares, 551 times. The most rare, again, is black; in 1,000 matings, black stallions, 125 times; in 1,000 matings, black mares, 190 times.

4. The occurrence of other colours than that of the parents is, as a rule, due to "casting back" to one of the ancestors. Chestnut is the colour which is most responsible for this.

5. Colour is transmitted without any regard to the gender of the offspring. Brown occurs, however, in greatest degree amongst mares, especially in colour-crossing; for every 1,000 brown horses there are 1,091 brown mares. Where *pure-colour* breeding has been persevered with, grey is transmitted in greatest degree to the female offspring, in *colour-crossing* to the male; in the latter, for every 1,000 grey horses there are 948 grey mares. For other colours in colour-crossing, for every 1,000 chestnut horses there are 1,013 chestnut mares; for every 1,000 black horses there are 1,036 black mares. It is probable that the higher reproduction of brown as a colour in the offspring is due to the greater hereditary power (transmissible) of the mare, through which also the female gender is more favoured as to numbers.

HORSES REQUIRED FOR THE INDIAN ARMY.

By J. H. B. Hallen, M.R.C.S., M.R.C.V.S., General Superintendent, Horse-Breeding Department.

(*Continued from page* 348).

32. It will be interesting for us to refer to the stallions that have been employed in Government horse breeding in India for the last ninety-four years and to trace the practical results of the using of each class of sire. Many of my hearers who are in the Artillery and Cavalry branches of the Army, or more especially the officers of the late Stud Department, or present Army Remount Department, will be able to follow me in my description of the country-bred stock of each class of sire, as of recent years found, and now present in the regiments and batteries of the Indian Armies.

33. The imported and other breeds of sires employed since the inaugurating of Government Stud Establishment in 1794 have been:—

English Thoroughbred.
Arab.
Australian.
Cape.
Stud (Home Indian Stud-bred).
English Half-bred (Roadster "Shaw" and Norfolk Trotter).

34. Allow me to give a short description of the produce of each class noted, out of country-bred mares.

35. By thoroughbred English the stock is as a rule handsome in top and outlines of back, hind quarters, and carriage of head and tail, but is often shallow in girth and back rib, light in barrel, and from 70 to 80 per cent. are leggy and deficient in bone of limb. Diseases of legs are more common among thoroughbred stock, *e.g.*, Curb, Bone Spavin, Bog Spavin, and Ring Bone are not infrequently shown. Few of this stock prove fit for British Cavalry, and hardly one for Horse or Field Artillery; but some are purchased for Native Cavalry. Many native breeders are distrustful of this class of sire, as they find their stock do not realise a good price in the market.

36. By Arab stallions the produce is smaller in height than that by the

thoroughbred English, but is very pretty, having an even outline of back, loins, and hind quarters, with good barrel and handsome carriage of head and tail; but the legs are often light under the knee, though of better, harder, and more lasting material, and freer of disease than the stock of the thoroughbred. The small size of the produce by Arabs is the objection raised by breeders, dealers, and Army remount agents, and as this stock realise lower prices than larger stock, so the Arab sire is more or less at a discount. Had the breeders large and broad 15-2 mares, and were these mated with true Arab horses, doubtless higher produce would be obtained, and then the Arab sire would become a favourite, for his hardness of constitution and steel like limbs, with beauty of conformation are points generally acknowledged by all Asiatic horsemen.

37. By Australian sires, which as a rule have been thoroughbreds, indeed thoroughbred English, bred and reared in Australia, the young stock prove often better-boned in limb than the stock of imported thoroughbreds from England; but in other points are similar to the stock of the English thoroughbreds.

38. It was suggested in 1885 that stallions, thoroughbred, but showing more substance of limb, and of better constitution might be obtained from Australia, and I accordingly addressed twelve of the leading breeders of that country by a circular letter, in October of that year, on the subject, but received only one reply, and that from one of the most successful breeders as follows:—

"I shall have much pleasure in doing what I can for you in informing breeders of your requirements. I must, however, say at the outset that there are very few breeders who breed the description of horse you require, and who would care to export them for the money. We are in quest of the same kind of horse ourselves. The stallions mostly used are those which have been on the turf. The good ones fit to breed from are worth £500 to £1,000, and those which might be got at your figure [£250] would not be the sort you require, or, indeed, would it be judicious to breed from them being mostly on the leg, and without substance. This is not saying much for our horses—but the fact is, breeding is such a hazard, the good ones are exceptions, and most breeders only breed for the turf."

39. By Cape horses some stock has been obtained, but only a few Cape sires have been in the Indian studs. They have produced good wiry-limbed stock, rather light in general build and limb, and not of sufficient size and power for general army requirements. At the present time no sires of this class are in the Horse Breeding Department.

40. By stud-bred sires, *i.e.*, horses bred in India and reared by the late Stud Department, some good stock have been obtained, more especially from those with half-bred English blood in their veins, but those possessing chiefly thoroughbred and Arab blood have as a rule produced stock light in bone and limb.

41. By half-bred English horses. Under this head are included the several classes named Roadsters, Hackney and Norfolk Trotters, also some horses imported from England years ago, I believe of Yorkshire breed, and were known in the late Stud Department as "Shaws," having been provided by a breeder or dealer of the name of Shaw. These several half-breds have been said to be pure half-bred horses, not mongrels, as an immediate cross of the thoroughbred horse and cart mare, but the produce of a systematic course of breeding originating in the cross of these two breeds. The Yorkshire, Cleveland, Suffolk, Lincolnshire and Norfolk horses are representatives of the results of this original cross, and these breeds are now acknowledged as separate and distinct, possessing pedigrees by which they prove that they are each of a distinct class and are thus pure half-breds.

42. The horses of these breeds that have lately been imported to India for stud purposes have been chiefly Roadsters and Norfolk Trotters; and these have, with country-bred mares produced stock of good bone and power, proving suitable and sufficiently well bred for Army work in India.

43. I may mention that as a rule most of the best-boned stock in the late Stud Department when inspected by the Special Stud Commission during the years 1872-76 had half-bred English blood in them; more especially did some, not all, of the Shaw horses' progeny show more bone and general substance. The Special Stud Commissioners bore this fact in mind and advised the employing of more half-bred sires; these to be of pure breeds and showing quality. Some of the half-bred sires that had been imported from England were, in the opinion of the Commissioners, of not sufficient quality; but they found their produce proving excellent for artillery purposes. A recommendation of the Commissioners that a certain number of half-bred stallions, as well as thoroughbreds, should be obtained and purchased by an officer having had experience in horse matters in India, was supported by the Government of India, and sanctioned by the Right Honourable the Secretary of State for India in Council, and Lieutenant-General A. R. Thornhill, who had been many years in India, and was well known for his sound judgment of horse-flesh, as Joint Remount Agent in Bombay, for the Governments of Madras and Bombay, was appointed purchaser of stallions for the Indian Government. This officer since 1876 has bought all the English-bred stallions sent to India, and I take this opportunity of recording my expressions of gratitude to him for having provided the Horse Breeding Department with the very good stallions we have received.

44. I, of course, do not wish to imply that every stallion has proved a success, but I do most distinctly affirm that at least 90 per cent. of the half-bred sires have fully realised the expectations formed of them. These horses were for several years considered by horsemen in India, accustomed only to thoroughbred, Arab, and country-bred stock, too coarse and unfit for the purpose of improving the breed of the horses in India. Some persons have declared them to be cart-horses; but such an opinion could only emanate from minds biased against the breed, or ignorant from a lengthened and probably continuous residence in India, of horse-breeding as now obtaining in Great Britain and Ireland, and the Continent of Europe. Again, these horses have been called Belgian, Flemish, etc.; but as they have been mostly bred and reared in Norfolk, where their sires and dams of pure Norfolk blood can be seen, and as from the produce of these, the Norfolk Trotters sent to India have been selected by General Thornhill, we can but accept them as Norfolk horses.

45. Gentlemen, we are aware that most Englishmen, from their love of horses, consider they have, and doubtless do possess a right to hold and deliver opinions regarding horse-flesh; and on this fact rests, no doubt, the diversity of opinion obtaining on the subject, as each lover of a horse has his or her particular class or type of horse to love. It is amusing to hear opinions passed by judges of horses when they are inspecting the Government stallions.

46. The cavalry officer, when looking at a handsome thoroughbred, declares that breed to be the right one for Indian Stud work. The artillery officer exclaims when looking at an active well-boned Trotter, "Ah! this is the horse in my opinion suited for producing good Army horses for India." A lady who has been admiring a very pretty Arab horse, ejaculates, "What a dear! truly lovely."

47. But the Government of India are desirous of obtaining a sufficient number of really good army horses bred and reared in India, and capable of doing good work by having blood, bone, and power to enable them to carry and

draw the heavy weights of British cavalry and artillery, in all vicissitudes of climate. The practical results of horse breeding that have obtained and are obtaining in India indicate that such horses cannot be produced from the present country-bred mares by mating them with thoroughbred or Arab stock, that very few per cent. of remounts so bred prove fit for those branches of the service: but we are having day by day more proof that the produce of these mares by half-bred English horses (or as they are now called in England, Hackneys) of pure breed, is well adapted for general army work in India, thus indicating that the more this class of sire, *the well-bred half-bred*, is employed, a greater chance will be afforded of securing larger framed country-bred brood stock, which will yield still larger-framed and boned produce, and the mares of this improved and developed stock may in time become large enough in bulk to allow of their being mated to Arab sires; should it be deemed desirable to add more quality and compactness in bone, with powers of endurance, which are the well-known characteristics of the true Arab.

48. I do not mean the Persian Gulf Arab, the cross between the Arab and Persian which has been during the last thirty-five years bred to meet the wishes of Indian cavalry officers, who gain in this cross the addition of one or two inches in height at the expense of a certain amount of steel-like bone, tough ligaments, and tendons.

49. It therefore becomes evident that the above lines, based upon practical results, are sound, and should be adopted in horse breeding in India. It is apparent, likewise, from results both in the late Stud Department, and in the present Horse Breeding Department, that the thoroughbred English and Arab horses are not the sires to mate with country-bred mares, as most of the produce prove generally leggy, light in barrel, and too light in limb for general army purposes.

50. Doubtless the stock is pretty, and shows great quality, and as a rule has speed, but the latter only when carrying light weights over short distances. But this is not the type of horse wanted for the Indian army.

51. My experience with regard to the employing of thoroughbred and Arab stallions in India commenced twenty-six years ago, when superintendent of the Stud Department in the Bombay Presidency, and then I believed it right to use these breeds of sires for the mares of the country. I have now to confess that on visiting, three years ago, one of the best breeding districts in the Bombay Presidency, and attending an annual horse show held there, I found the stock resulting from the use of these sires, though very handsome in top, and pretty in carriage of head and tail, lamentably deficient in bone and sinew of limb, leggy, and wanting in girth. The director of the Army Remount Department was present at the show with the hope of finding remounts, but he did not succeed in seeing one fit for the British services: I believe that not one country-bred remount for the British services has been secured as yet in the Bombay Presidency. May I therefore ask you to remember that thoroughbred and Arab stallions have brought about this result.

52. Bear with me while I remind you that the English thoroughbred of to-day is generally acknowledged to be, when compared to the thoroughbred of a century ago, an animal deteriorated in constitution and in limb, and as a rule only fit for the purposes for which he has of late years been mostly used—viz., to carry light weights at a tremendous speed over short distances, often measured only in furlongs. Again, the pampered life in which the thoroughbred has been bred and reared for a century or more, does not add to his fitness to become a sire of animals to be used for hard work over long distances and on scant commons.

53. The Arab by his breeding, life, and history, is by far better qualified to impart blood, toughness of sinew, compactness of bone, hardiness of

constitution, with powers of endurance even on the shortest of forage than any other sire. His size is his only weak point, as an army horse; but when a really hard campaign ever comes off, and but little grain or forage is to be had, the cavalry mounted on horses possessing Arab and country-bred blood will be found the most enduring war horses, and more suited than any other breeds for tough work.

54. Still, as the demand for army horses of greater size, bulk, power, and weight is made on account of there being heavier men to carry and guns to pull, the lines I have indicated for producing a larger type of horse will, I believe, be found sound and successful.

55. We should, I believe, rely on the pure half-bred of England as a sire, to give more bone and substance to our stock.

56. But if better stallions possessing these qualifications and sufficiently well bred, and of a pure breed can be obtained in any other country, most certainly should they be secured for India.

57. Again referring to thoroughbreds, let me mention that they are not used *per se* in England to produce anything but race horses, or for light weight carrying purposes. But the thoroughbred in England is now being employed by mating him with half-bred or even light cart mares to produce useful horses. I would invite your attention to two pamphlets written by Mr. Walter Gilbey, the one "Riding and driving horses, their Breeding and Rearing, March, 1885;" the other, "Suggestions upon Horse Breeding, 1886." Both published by Vinton and Co., No. 9, New Bridge-street, Ludgate Circus, London, E.C.

58. Mr. Gilbey ranks as one of the most successful breeders in England, and I believe a perusal of his most interesting papers will convince you that he writes on a subject that he is practically acquainted with.

59. Let me also suggest to all interested in horse breeding in India to read the following books on the subject:—

Moorcroft's "Observations on the Breeding of Horses within the Provinces under the Bengal Establishment, by William Moorcroft, Superintendent of the Honourable Company's Stud," written about the year 1815.

"Report of the Stud Committee, Bengal, 1869," of which Major-General Colin Troup, C.B., was the President.

"Final Report of the Special Stud Commission, Bengal," 1876.

"Government Horse Breeding in India, Past, Present, and Future,"—a paper I read at a meeting of this Institution on the 6th May, 1887.

The above books will be found in the library of this Institution.

60. In conclusion, let me assure His Excellency, Sir Frederick Roberts, who has so very kindly occupied the chair on the present occasion, and you all, gentlemen, that no man loves the high-bred horse more than I do. No man values blood, enduring powers, more than I do. Many dear friends and companions in the hunting field I have had, and still have in India, know well that I am generally to be seen when hog-hunting on an Arab, or half-bred Arab country bred, as from their blood, powers of endurance and steel-like quality of limbs, I know they are, though small in stature, well able to carry me safely, and will last under my heavy riding weight of fourteen to fifteen stone during a long day, under a tropical sun.

61. One word more; pray do not go away with the idea that I mean there are no good thoroughbreds. I speak of the thoroughbred as now-a-days generally obtainable; not of the few exceptionally grand horses whose names may be found in the Stud Book.

62. In order to obtain stouter and better boned thoroughbred horses, racing weights and distances must be increased to those in vogue a hundred years ago.

THE PASTEUR INSTITUTE.

THE new Pasteur Institute at Paris was opened on Wednesday, November 14th, by the President of the Republic, who was accompanied by M. Floquet, M. Goblet, M. Lockroy, M. Jules Ferry, the Presidents of the two Chambers, the Turkish Ambassador, and several other political notabilities. A large number of Members of the Institute, including the Duc de Broglie, M. Léon Say, M. Jules Simon, M. Duruy, M. Berthelot, and Baron Alphonse de Rothschild. The large library in which the ceremony took place was filled to overflowing. The President of the Republic took his seat shortly after one o'clock, having M. Pasteur on his right. The proceedings opened with a brief speech by M. Bertrand, the Secretary of the Academy of Sciences, who eulogised M. Pasteur and his manifold researches in the domain of science. Dr. Grancher followed with an interesting statement, in which he spoke rather strongly of the systematic opponents of the Pasteurian method, who, instead of meeting him in fair argument, denounced him as a charlatan. He contrasted this with the action taken by the Committee of investigation appointed by the English Government, and he quoted with pride the report of this Committee, which, including eminent men of science, like Sir Henry Roscoe and Sir James Paget, had, after long and patient investigation and experiments, come to the conclusion that M. Pasteur had discovered a preventive against hydrophobia comparable to vaccination against Small-pox. Dr. Grancher went on to state that since the middle of 1885, when the first two human beings were inoculated, 5,384 persons had passed through the laboratories in the Rue d'Ulm and the Rue Vauquelin, and that the rate of mortality, which had been 1·34 per cent. in the first year, had been reduced to 0·77 per cent. in the first six months of this year. This rate of mortality, be it observed, comprises the deaths of persons who had the poison already established in their system when they come to be inoculated, so that to get at a really precise estimate of what the effect of the inoculations has been they ought to be omitted from the calculations. If this were done the rate of mortality would be still lower. But the figures, even as they stand, are very striking, for the estimated mortality previous to the discovery of the inoculation method was about 16 per cent. of the persons bitten. Dr. Grancher stated that twenty laboratories altogether have been established for preventive inoculation, seven in Russia, five in Italy, and one each in Roumania, Austria, Brazil, Cuba, and the Argentine Republic; one will shortly be opened at Chicago, and one in Malta, the last named being the only one on British soil. Statistics from all these places were read, by which it was sought to show the great reduction of mortality, the proportion of fatal cases being higher in Russia than elsewhere, as most of the victims had been bitten by wolves, the virus of which is so much more deadly than that of the dog. M. Christophle, the treasurer of the fund, reported that the subscriptions, which included handsome sums given by the Czar, the Emperor of Brazil, and the Sultan, amounted to over £100,000, of which just three-fifths had been spent in building and equipping the Institute, leaving only £40,000 as capital for an endowment fund. The grants made by the Government have hitherto been about £5,000 a year; but the desire of M. Pasteur and of his Committee was to obtain further private subscriptions, which will render the Institute independent of the State. M. Pasteur experienced so much emotion, that he did not feel equal to delivering the speech he had prepared, and this was read by his son, who is an *attaché* to the French Embassy at Rome. It consisted of a brief review of his past work, and of the various researches he intended to prosecute in the new building. The President of the Republic, without making a speech, decorated with the Officer's Legion of Honour Dr. Grancher and M. Duclaux, and conferred minor distinctions upon two other of M. Pasteur's assistants. Upon the conclusion of the ceremony, M. Pasteur conducted the President of the Republic and his other distinguished visitors over the new building.

THE NEW FIRE-ARMS IN RELATION TO VETERINARY SURGERY.

THE immense improvements which have been recently made in fire-arms deserve serious consideration not only from army surgeons, but also from the officers of the Army Veterinary Department, and those who take an interest in military surgery generally. Of the fire-arms in use, perhaps the most striking improvements have been introduced into the rifle, which has now become a terribly destructive weapon at an almost incredible range. Especially is this the case with the small-bore or Rubini rifle now adopted for the British army, which will probably kill either man or horse at a distance considerably more than two miles. The rapidity of fire is also another feature in the mechanism of the rifle, that renders it still more formidable, and especially when employed against mounted troops. The new service magazine rifle sends a bullet with immense velocity, and has therefore a flat trajectory to a great distance, its accuracy, range, and penetration exceeding that of any rifle heretofore produced. This is proved by a trial which recently took place at the Cæsar's camp ranges, Aldershot. In this the target represented a battalion of seven companies at war strength, standin quarter column. The front company were represented by iron and wood screens, the remaining companies by wooden screens of thickness varying from a quarter to three-quarters of an inch. The average percentages of hits obtained in different experiments at a range of 2,800 yards were respectively 43, 26, and 15. A heavy mist obscured the target at all the ranges. The bullets penetrated the wood and were flattened against the iron screens at 2,800 yards.

We have said that the rifle is a small-bore, and the bullet is therefore very small. Indeed, cartridge and bullet (they are, of course, in one piece) are not much thicker than an ordinary pencil, and measure only three inches, the cartridge being two inches, and the bullet one inch by a quarter inch. The small-bore rifle has had its opponents, who asserted that such a tiny bullet *might* stop the advance of a man, but could not be trusted to do so in the case of a large animal like the horse; therefore it would prove useless in checking a cavalry charge. Even the bullet of the new Martini-Enfield rifle, and which was smaller than that of the Henry-Martini, but nearly as heavy again as that of the Magazine rifle, was suspected to be too small to drop a horse. The question was one of the utmost importance to decide, and it was considered that nothing but an experiment on the bodies of horses could settle it, unless we waited until it could be tried in actual warfare; but then the result might be hazardous in the extreme.

It was therefore resolved that a trial should take place of the Martini-Enfield and the rifle we have noticed, in order to ascertain which was most likely to check a horse in a cavalry charge, the bullet of the former being nearly as heavy again, 384 grains, as that of the latter weapon, 216 grains. The trial took place at the Small Arms Factory, Enfield, a short time ago, and the arrangements were chiefly entrusted to the Veterinary Department. The Principal Veterinary Surgeon was present, and the details were carried out by Inspecting Veterinary Surgeons Evans, Lambert, and Walters, and Veterinary Surgeons Duck, F. Smith, and F. Raymond.

For an account of the trial, the following is obtained from the report furnished by the Principal Veterinary Surgeon to the Small Arms Committee. He says:—

As I was present, assisting at the experiments, and supervising the examination of the bodies of the horses in order to ascertain the effects of the bullets, I may be allowed to make a few observations introductory to the general detailed report.

Six cast horses belonging to the Royal Artillery at Woolwich, had been sent to Enfield for the experiments; but only four were utilised, as sufficient evidence with regard to the effects of the bullets had been obtained in these. They belonged to the class of "leaders" in a gun-team, and therefore might be taken to represent either cavalry or artillery horses. They were in good condition, and free from any disease or blemish which might have influenced the result of the experiments. They were killed instantaneously by shooting them in the brain, and then slung in such a manner as to present, as nearly as possible, the normal standing attitude of the living animal.

In order to prevent the embarrassment and uncertainty which must inevitably have been produced, had many shots been fired into the carcasses before the points selected for testing had been hit, an iron plate or shield, with a small round opening in the middle, was employed to protect the body, against which it was slung; the opening in the centre corresponding to the part into which the bullet was to penetrate. By means of this plate, which, being whitewashed, played the part of a target, the central opening, four inches in diameter, being the bull's-eye, the eighteen shots described were well placed for the purpose of comparison of effects.

Three extra shots with the Rubini rifle are added, as, being in the nature of misses, they are not favourable for comparison.

Two bodies were in position at one time, one being allotted to each rifle, and were shot at alternately; the first two were fired at from 200 yards, but it was so difficult to send the bullet through the target-opening at that distance that the range was changed to 100 yards. The second two bodies were fired at from 50 yards.

With regard to the effects of the firing, and judging as to the influence they would have on living horses, it may be remarked that a horse, and especially when madly excited, can only be stopped *at once* when shot in the brain, through the cavities of the heart, or when a large limb-bone is so broken that it cannot any longer afford support to the body during progression.

Therefore, putting aside the brain and heart wounds, which would be immediately fatal, but which are not those most frequently occurring in action, the damage done to limb-bones of horses is always an important consideration in estimating not only the penetrative force of a bullet, but its fracturing or pulverising action. Horses may go some distance after being shot through the lungs, or after important blood-vessels are divided, this depending upon the amount of hæmorrhage. With regard to other organs, they need not be taken into account, as injury to them will not immediately render a horse inefficient. Neither need injury to muscles by rifle bullets be considered of much importance in disabling horses quickly, as in these animals the muscular masses concerned in moving the limbs and sustaining the body are so voluminous that the damage done by a small bullet, unless it has become expanded or jagged through contact with a bone, will cause but little immediate trouble.

With regard to the comparative effects of the bullets from the Rubini and the Enfield-Martini rifles, there cannot be any doubt, judging from these experimeuts, that the bullet from the former has the most destructive effect upon such hard tissue as bone, and perhaps also upon soft tissue like muscle. The terribly destructive effect of this bullet upon bone was well seen in the shot above the knee and in that at the hip. Here the largest bone in the horse's body—the femur, or thigh bone—was struck at its thickest and strongest part near the hip-joint, and for some inches nothing larger than coarse grit remained: the immense bone was literally pulverised, as if crushed in a flour-mill; while the Enfield-Martini bullet, striking this bone in exactly the same place, had not the same pulverising power, there being more splitting and splinters, though the destruction of the bone was complete.

The destruction of muscle along the track of the bullets was noted, and the "pulping" was most marked with the Rubini bullet. The aperture of entrance was much smaller, and that of exit very much greater with it than with the Enfield-Martini bullet. This was well shown in the front chest shots passing through the heart.

When the Rubini bullet comes in contact with a hard substance, as bone, the copper covering flies off, and this in all probability increases the destructive effect, if not at the point of impact, at least around it. When it, however, enters soft tissues—as muscle—the copper remains, as was seen in one shot; so that the disorganisation which results cannot be ascribed to the action of the copper splinters.

To what extent the comparative effects of the two rifles and their bullets might be influenced by greater firing distances, it is for the Committee to decide. My own impression now is that, at the distances fired from in these experiments, the Rubini rifle is more destructive to animal tissues than the Enfield-Martini.

(*To be continued.*)

Reviews.

THE HORSE AND HIS RIDER: AN ANECDOTIC MEDLEY. By "THORMANBY." (London: Chatto and Windus. 1888.)

The writer who, under the *nom de plume* of "Thormanby," is so well known in sporting circles, especially by his clever book, "Men of the Turf," now presents us with a companion work on the horse and his rider, which is certain to be read by the great majority of those who love to read anything entertaining or informing pertaining to the most useful and enjoyable of all quadrupeds. We have perused the volume from end to end, and promise ourselves a renewal of the treat as often as opportunity offers. The twenty-two chapters of which the book consists are none of them dull, but, on the contrary, instructive, entertaining, or profoundly amusing. Racing, steeplechasing, hunting, horse-taming and breaking, special characteristics and endurance of horses and their masters, form the staple of the anecdotes and narratives, all told in a vivacious manner, and in a way to drive off sleep or dispel gloominess and melancholy. The story of Squire Chute and his servant, given at page 132, is certainly mirth-provoking to an extent we have seldom experienced. In treating of the endurance of horses, we do not find mention of the wonderful feats of the little Arab steeds ridden by the lamented Colonel Barrows' 19th Hussar troopers, in the Soudan.

THE HORSE. By SYDNEY GALVAYNE. (Glasgow: T. Murray and Son. 1888.)

Mr. Galvayne has made a reputation for himself as a tamer and breaker of horses in this country, and the work he has written embodies the principles and practice of the art he pursues so successfully. It gives these in detail, and we must admit that all who have to do with horses, and especially with handling them as colts or adults, tractable or vicious, must find much in the book to inform and instruct them. The author's system of horse-taming is, he says, an entirely new one, and he has sought to popularise it and make himself useful, by forming and teaching

classes of learners, and giving public demonstrations in many parts of the country. His experience has been chiefly gained in Australia—an excellent field, no doubt—and there are many points which are novel to us. For veterinary surgeons, there are numerous hints which should prove of value to them in their every-day business, especially those relating to twitching and casting. The anecdotal portion of the book is interesting, and indeed the little work deserves a favourable reception from horsemen and members of the profession, because of the amount of information and entertainment it offers.

Proceedings of Veterinary Medical Societies, &c.

NORTH OF ENGLAND VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting of this Association was held in the Empress Hotel, Sunderland, on August 31st, the President, Mr. D. Dudgeon, in the chair.

Present—Messrs. D. McGregor, Bedlington; C. Stephenson, H. Hunter, W. A. Hancock, A. Hunter, J. W. T. Moore, Newcastle-on-Tyne; J. B. Nisbet, Fence Houses; Wm. Awde, Stockton; J. E. Peele, Durham; A. Chivas, Corbridge-on-Tyne; J. E. Tudor, South Shields; Wm. Temple, Chester-le-Street; John Gofton, North Shields; T. Jack and G R. Dudgeon, Sunderland.

Visitors—Messrs. Alfred Peele, D. Dudgeon, Jun., R. Brydon, and J. A. Morkeberg, of the Royal Agricultural Society, Denmark.

Apologies for non-attendance were received from Professors Williams, Axe, Walley, McFadyean; Messrs. W. T. Briggs, C. Hunting, G. Farrow, Jun., G. Elphick, and T. Greaves.

Mr. C. STEPHENSON then read the following paper on

HEREDITARY UNSOUNDNESS.

GENTLEMEN,—By the express wish of our much-esteemed President, I have this day the honour to bring before you the subject of "Hereditary Unsoundness," a subject of vast importance, and one that at the present time is commanding a large amount of attention.

I cannot possibly bring this subject before you in all its varied aspects; neither is it possible for this meeting to thoroughly discuss it. What I purpose attempting to do is to bring before you, as briefly as possible, those defects or diseases which in breeding animals are looked upon as hereditary, and to direct your attention to the subtle questions of "Heredity" and "Atavism."

When we in our learning speak of heredity and atavism we are only giving expression to the old-fashioned truism that "like begets like." By "heredity" we mean the transmission of the characters and peculiarities of parents to their offspring; and the word atavism is applied to those cases in which the peculiarities, type, markings, etc., of some old ancestor, aristocratic or plebeian, as the case may be, reassert their latent powers and are reproduced.

This throwing back, as it is termed, is a very interesting subject, particularly to breeders; but as it is only a branch of the main question before us, I need not dilate further upon it. Before proceeding further I think it will be advisable if we refresh our memories by casting back and recalling as many instances and cases as possible in which we have seen heredity assert its powers. I know that you have all seen many such cases, both in man and the so-called lower animals—cases in which peculiarities of form, temperament, malformations, diseases, and vices could be clearly traced from parent to offspring, and were, in fact, characteristics of certain families.

Not that every member of a family or descendant of a sire is constituted or affected alike. Some escape the family characteristic, or it may lie dormant; but the tendency is there, and will, under favourable circumstances, assuredly be developed or reproduced.

Striking instances of "heredity" are found in the human family, but as veterinary surgeons we will on this occasion confine our attention to our friend the horse. It is neither advisable nor necessary to mention the name of any particular sire, knowing as I do that every one interested in horses and their breeding will be able to call to mind numerous cases in which the offspring of certain sires were noted for special or uniform qualities—cases in which temper, action, stoutness, softness, soundness, and unsoundness, together with peculiarities of form and colour, were family characteristics. As striking, common, and harmless examples of heredity I have only to mention the lop ears of the Melbournes, and the sprinkling of white hairs that in old times denoted the McOrville blood, and in more recent times the Bird-catchers.

With these few introductory remarks I will now notice the principal diseased conditions met with in the examination of horses. Beginning with the eyes, I take it that we shall all agree that "Cataract" is an hereditary unsoundness; and I trust you will forgive me for mentioning that examination of the eyes requires great care and judgment. I don't think that any experienced examiner would confound opacity of the cornea with Cataract; but I would direct your attention to the changes produced in the eye by old age, changes which require due attention before pronouncing an opinion.

Wind.—In my opinion Roaring, Whistling, and Grunting should be classed together as variations of one disease, and condemned as hereditary unsoundness. This may be a too strong, a too sweeping assertion to some, *i.e.*, so far as regards Grunting, but, gentlemen, my experience is that Grunting is too often only a forerunner of Roaring, and that as a rule Roaring and Grunting go together. I am well aware that horses sometimes grunt, and yet make no noise in their gallop; but grunters always take the first opportunity—the slightest excuse—to develop and perfect their musical tendencies. Some may say that Grunting is no sign of Roaring. Quite so; neither is it a test for roaring. I have known bad roarers that did not grunt; therefore the absence of the usual grunt of the roarer is not a sure and reliable test for soundness of the wind.

Splints.—Splints of themselves, and upon young horses, are not, in my opinion, hereditary; but if found upon a mature horse, and especially if accompanied with bony deposits upon other parts, they should be looked upon as hereditary. Splints are often the result of work and concussion, but some horses have a tendency to throw out or deposit bony enlargements. I once had a patient of the latter description, a well-bred hunter, and a troublesome one he was. Eventually I had the opportunity of making a *post-mortem* examination upon his remains, and so strongly was this bony diathesis developed in his system that the coats of some of the arteries had been changed into bony cylinders. Splints may be, and often are, quite independent of heredity. I would just mention here that I knew a thoroughbred sire, perfectly free from bony enlargements, in fact sound, and yet a large percentage of his stock were affected with splints. How far atavism will account for this case I leave you to decide.

Ringbones, whether large or small, upon the fore pasterns or upon the hind ones, even if they do not cause lameness, must be considered as hereditary. Before condemning a horse for Ringbone, care must be taken that the enlargement is neither due to a fractured pastern nor to break-down of the suspensory ligament.

Sidebones.—The heredity of Sidebones is so patent and well established that I simply mention them to complete the list of hereditary diseases.

Diseases of the Foot.—Approaching this part of our subject I do not expect unanimity of opinion. The feet of horses vary more or less in size, strength, and shape. We may have personal objections to a particular kind of foot, but if the feet are natural, free from visible disease, and the horse goes sound, we, as veterinary surgeons, should not, in my opinion, object to them. It is not always the best-looking feet that wear longest, and it is no unusual thing to see narrow, donkey-like feet stand work remarkably well. At the same time, I think that veterinary surgeons should, when called upon to examine a horse, always point out any peculiarity or deviations in the shape of the feet.

When I say that "*Navicular Disease*" is hereditary I do not anticipate opposition from any one; but when I say that in my opinion "*Laminitis*" is hereditary I know that men of the highest standing will say No.

Now, I freely confess that the result of my inquiries *re* the heredity of Laminitis is almost nil. I have only come across one gentleman who said he had seen malformed feet in young horses sired by a stallion suffering from Laminitis. On the other hand, I have the testimony of A. B., an expert in horse-breeding. He has three stallions, all suffering from chronic Laminitis. Nos. 1 and 2 have been affected for twelve years, and No. 3 for eleven years. He tells me that he has records of over 2,500 foals by these horses, none of which are affected with Laminitis; but he observed No. 3 has upright pasterns, and all his stock have the same defect. I have received similar information from another gentleman who has owned sires that suffered from Laminitis.

In considering this particular disease we should not expect to see it developed in young animals before they are put to work, any more than we should expect to see Navicular Disease. The question is, Are the produce of horses so affected more prone to the disease? Is there a greater tendency to develop it when put to work than in stock sired by a horse with perfectly sound feet? I think there is, and I have always rejected sires that were suffering from Laminitis.

I may mention that I have this year seen three young horses with feet of such a character as at once to draw attention to them. No. 1, a four-year-old, feet blocky, and marked with small rings; goes sound. The dam of this colt before being put to the stud was so lame from Navicular Disease as to be valueless. No. 2, a one-year-old, odd feet, goes sound. His sire has odd feet. No. 3, a three-year-old, feet large, thin, and suspicious-looking, but goes sound. The sire of this animal was affected with chronic Laminitis.

Sandcracks and marks of old sandcracks, independent of accidental causes, would, in my opinion, justify the rejection of any sire so affected.

Now, gentlemen, we will pass on to the hind legs, and I take it that all will agree that *Spavin* is an hereditary unsoundness. Unfortunately, trouble often arises as to whether a horse has Spavin or not. When they are large there is never any dispute as to their nature and importance; it is the little ones and the tarsal ridges that lead to so many disputes. Well, we are not all blessed with the same amount of knowledge, natural or acquired, neither have we all the same delicacy and perception of touch and eyesight, and we can only hope that these unfortunate disputes will be few and far between in the future.

Curbs and Curby Hocks.—Curbs are not hereditary, but curby-looking hocks are. A horse with the best of hocks may at any time by some severe exertion spring a curb, but it is only a temporary injury, neither permanent nor hereditary. On the other hand, a sire free from curb, but with curby-looking hocks, will transmit the defect or peculiarity (call it what you like) to his stock.

Stringhalt and *Shivering*, being nervous affections, are pre-eminently

hereditary. These defects, if not carefully and especially looked for, may escape detection. When found there should be no doubt as to their condemnation.

Bursal enlargements in a sire seldom receive that attention which in my opinion they deserve. I have no doubt as to their heredity.

Now, gentlemen, we will notice the ticklish question of *odd feet.* Many horses, particularly amongst thoroughbreds, have odd feet. They run in families, and are decidedly hereditary. Odd feet may be sound feet, and remain sound at work. Because a foot is smaller than its fellow, it does not necessarily follow that it is diseased or unsound in any way. Odd feet are objectionable, just the same as turning the toe out or in would be, but if with the exception of being smaller than its fellow, it is sound and of good shape, and the horse is free from lameness, I cannot see that we are justified in condemning the horse as unsound. While saying this, I fully admit the heredity of odd feet. A foot, in addition to being smaller than its fellow, may be, and often is, more or less deformed; narrow and high at the heels; upright in front; there may or may not be lameness, but these cases should, in my opinion, be condemned as unsound. The slightest trace of disease or lameness in odd feet justifies rejection.

Over and above the diseases I have mentioned, there are others occasionally met with, and which deserve some of our attention, namely, *Broken Wind*, *Greasy Legs*, and *Mallanders.* The latter I would not have mentioned but for the fact that I recently saw a cart stallion objected to for having only slight remains of Mallanders. Although Broken Wind and Greasy Legs are largely due to bad management, and admitting that both affections may by treatment be much modified, if not cured, yet I would condemn any sire so affected.

I will now direct your attention to *acquired unsoundness*, which will open out a large field for our thoughts and investigations, and one upon which some of us will, I expect, agree to differ.

This portion of our subject presents itself to us in two aspects: in the first place, how are we to detect, or can we detect, the difference between acquired and hereditary unsoundness? and secondly, is the acquired unsoundness hereditary?

Beginning at the eyes again, cataract, which is admitted to be hereditary, my be, and often is, the result of an accident. I have known cataract to follow even a slight blow from a branch in a fence. I have also known dislocation of the lens, and even entire destruction of the eye, follow an accidental injury. I have seen complete cataract in both eyes follow acute rheumatism, and I have seen total and continued blindness (amaurosis) resulting from a severe blow upon the occiput, accompanied with great loss of blood.

Now, gentlemen, whether the cataract is due to heredity or to accident, their appearance may be the same. There is no mark by which to distinguish the one from the other. True, a history of the accidentally caused one might be given, but might not be credited. The question arises, Are both to be rejected? or is the proved accidental one to be passed?

Much the same kind of argument might be used to many of the diseases which we admit are hereditary, but I need not follow this line further. I will only mention a few cases that point to acquired injuries being transmitted to offspring.

Ear Marks.—In August, 1880, I bought a lot of Irish heifers to feed off. They were ear-marked. One of them appeared to be in calf, and produced a calf with ears marked exactly the same as its dam.

At the beginning of the present year I came across a pedigreed cow (V) with calf at foot, both of which had short ears; the tips of both ears were

absent. This being a registered animal, I had no trouble in tracing her history, which I found to be as follows: She was calved with short ears, but her first, second, third, and fourth dams had perfect ears. She did not transmit the peculiarity to all her progeny, but her last two calves (bulls) had both short ears.

Deformities Resulting from Injuries.—About six years ago a hunting mare suffering from split pastern was given to a friend of mine to breed from. No treatment had been applied to the pastern, and as a consequence it was much deformed; the foot was turned outwards, and the upper portion of the pastern had come downwards and inwards. There was no fault in the first foal, but the second one when I first saw it had a foot and pastern almost the exact reproduction of the dam's deformity; but being young, immediate and continued careful treatment resulted in a satisfactory improvement. The third and fourth foals were all right.

These cases may not be of much value to the controversy; however, they are facts, not hearsay, and I venture to think of some value. On the other hand, I admit that no matter how short we dock our horses, dogs, and sheep, neither the foals, puppies, nor lambs come with shortened tails.

As bearing somewhat on this subject, I wish to mention that a veterinary surgeon in Northumberland told me recently that he had attended four foals this season suffering from *Open Urachus.* They were all by one horse, and he was affected with Laminitis. I trust that if any gentleman here has experience of Open Urachus being common or confined to the get of any particular horse, that he will give us the particulars. I may just remind you that Williams speaks of Open Urachus as a symptom of scrofulous disease associated with Ostitis.

Proposed Changes.—The following is an extract from a reported meeting of the Hunters' Improvement Society:—

The Council have carefully consided the important question of veterinary examinations at shows, which has been raised by the letter of Sir Henry Simpson, read at the general meeting of members held at the Royal Agricultural Hall; they therefore propose, as there is a diversity of opinion among the veterinary profession as to what constitutes hereditary unsoundness, that the veterinary inspectors, after examining the horses submitted to them, will fill up the following certificate, which will be handed to the judges by the stewards; the judges will then use their own discretion as to the award of premiums:—

REPORT OF THE VETERINARY INSPECTORS TO THE JUDGES.

Thoroughbred Horse No.....

Eyes .....
Wind .....
Fore legs .....
Hind legs .....
Feet .....
Remarks if any:—

..... } Veterinary
..... } Inspectors.
.....

Date.....188

This proposed change must be very unsatisfactory to the profession, and it is certainly hard upon the judges to add to their responsibility by asking them to decide as to what shall constitute unsoundness.

As a result of communications from the Royal Commission on Horse-breeding and the Royal Agricultural Society, the Council of the Royal College

of Veterinary Surgeons have decided to hold a conference to discuss and report upon this question, *i.e.*, to decide what diseases are to be considered as constituting hereditary unsoundness. Some members of the profession attached great importance to this conference, and speak as though its decision would settle the question. That is not my opinion. I have no doubt but that the conference or committee who have the question in hand will easily agree, when sitting round a table, as to what is and what is not hereditary unsoundness; but disperse them to the actual work of examining horses, and the same old disputes will arise—not as to whether Spavins, Ringbones, and Sidebones constitute unsoundness and are hereditary—no one that I am aware of disputes that—but the dispute will be as to the actual existence of the diseases named. Some gentlemen will detect them easily, whilst others will entirely fail to do so.

In connection with this subject much valuable information may be learned from the work carried out by seedsmen and gardeners who make a speciality of producing high-class pedigree cereals and plants. The secret lies in selection. Only the most perfect grains of the most perfect plants are used for propagation. Of course along with selected seed there must be land and surroundings well adapted to produce best results. The same theory and practice hold good in breeding animals, and only sound, good animals should be bred from; but as mares do well to produce one foal per year, whilst the the stallion may beget 100 in the same time, it follows that the greatest importance must be attached to the soundness and general excellency of the sire, and more particularly is this so when we remember that his external characteristics, colour, action, etc., will to a large extent be reproduced in the foals.

I am confident that the more you investigate this subject as developed and seen both in the vegetable and in the animal kingdoms, the more you will believe in the subtle and far-reaching power of heredity, and the more importance you will attach to the selection of breeding animals. Allow me again to say that only sound animals should be bred from; at any rate be sure that the sire is sound and true to his particular type. Gentlemen, I have purposely curtailed my remarks, so as to give you as much time as possible to discuss the question. Before leaving it in your hands, I may remind you that although the question is at the present time occupying a great deal of attention on both sides of the Atlantic, there is really nothing new in it. We have, no doubt, thanks to Darwin and other workers, extended our knowledge upon it, but our Great Master in His supreme wisdom concentrated and expressed the whole truth when He said, "A good tree bringeth not forth corrupt fruit; neither doth a corrupt tree bring forth good fruit. For every tree is known by his own fruit. For of thorns men do not gather figs, nor of a bramble-bush gather they grapes."

The PRESIDENT next read a letter from Mr. T. GREAVES, of Manchester, which ran as follows:—

"The subject of Hereditary Unsoundness is one of very great importance. It is a complex subject, and for its full comprehension much anxious thought and patient investigation are necessary. I regret exceedingly I cannot be present to hear Mr. Stephenson's address upon this very interesting subject. I feel assured he will look the difficulties fairly in the face, and in a clear, bold, exhaustive speech trace out some guiding principles, enabling the profession to adopt and establish some definite, sound, common-sense decision in the matter.

"I desire to refer to only one of the many causes of Hereditary Unsoundness, viz., *Roaring*. The ideas I wish to bring before your notice are new; at least I am not aware of any writer or speaker having noticed them when treating on Roaring.

"For some past I have been making this subject a special study, and have made many *post-mortem* examinations of the larynx and recurrent nerves of horses which were roarers, and others which were not roarers. I find in all roarers where there is the usual defect in the arytenoid and crico-arytenoid muscles on the left side, that the recurrent nerve of that side is defective also—in many cases the *recurrent nerve does not reach the larynx at all;* the fibres of this nerve spread out or disperse themselves in the cellular tissue—and that not the slightest vestige of nerve tissue reaches within four or six inches of the larynx, and my conviction is that this nerve has not at any period of life given off any nerve force or influence to the larynx on that side; but at the same time, the right recurrent nerve which supplies the muscles and right side of the larynx is vigorous and strong right into the membranes and muscles on that side, the muscles of which are plump, fleshy, and well-nurtured, whilst the muscles of the other side are blanched, wasted, and apparently useless and helpless. In other roaring horses I have found the left recurrent nerve as thin as a third thread, instead of being as thick as a crow-quill. I find the thin nerve appears to have no nature in it; it breaks on the slightest tension as if rotten, while the other is as strong as whipcord. I find the recurrent nerves on both sides are thick and strong in all cases where the muscles of the larynx are in a sound and healthy condition.

"Now, the deductions or the conclusions I have arrived at are these: Firstly, that the blanched, wasted conditions of the muscles of the larynx of a roarer *have not always been in that condition*, but that at birth they were all alike well-developed. There being no breathing before birth, the muscles were not called into action; the muscular fibres could develop in accordance with the general law of growth, and at birth the muscles would be brought into action for the first time, and for a time the muscles might act until, as time went on, the want of nervous energy would be felt, and degeneracy of muscles be the result. Secondly, that the left recurrent nerve *was always the same from the earliest period of utero-gestation.* If this theory is correct it is truly an hereditary defect, and no human aid can possibly cause these muscles to regain their strength and vigour or the nervous fibres to elongate. The removal of the vocal cord and crico-arytenoid cartilage may remove an obstruction, and thus mechanically obviate Roaring. In this manner it is conceivable it can cure Roaring artificially.

"THOMAS GREAVES, F.R.C.V.S."

Mr. H. HUNTER, in opening the discussion on Mr. Stephenson's paper, said the subject was of very great importance, but that town practitioners had not the same opportunities of judging as country ones. He agreed with Mr. Stephenson that Roaring and Whistling were simply stages of the same disease, both bad faults and unsoundnesses. He did not quite agree with Mr. Stephenson in his remarks about Splints. In young animals they were troublesome, but in older ones they were not so important. Narrow feet were suspicious, but sometimes they caused no unsoundness. Odd feet also were to be looked upon with suspicion. At present he was driving a mare with odd feet, and she went perfectly sound. Navicular Disease is hereditary, and he would object to a sire with Laminitis being used for stud purposes. Curby hocks are most objectionable. He thought Grease somewhat hereditary, and that the question of acquired defects was a very difficult one to go into.

Mr. BRYDON said he had listened with great pleasure to Mr. Stephenson's able paper, and in the main agreed with what he had said. He did not agree with him on the question of Grunting, as he had known old stallions develop Grunting, and yet were perfectly sound in their wind, and he attributed it to the manner in which they were treated. They had to work hard for three months in the year, being heavily fed during that time, and the other nine months of the year they were turned into a shed, and sometimes fed on

almost anything. Laminitis, in his opinion, was not hereditary, and he instanced a stallion which had chronic Laminitis, and which had served, to his knowledge, between seven and eight hundred mares, and in no case was his progeny affected. With regard to acquired defects, he said it was the practice in Shetland to mark the cows by cutting the tips of the ears off, and it was no uncommon thing to find the progeny have the same marks. At Nottingham this year a great fuss was made about a stallion being rejected as unsound, and yet going to another show and being passed sound. He thought this was a great disgrace to the profession; veterinary surgeons should be unanimous in their opinions. Breeders put it down to jealousy. He concluded by strongly advising the veterinary profession to arrive at what diseases were hereditary and what not.

Mr. McGREGOR said that formations may become hereditary, and agreed that "like begets like." Jacob knew that well. He put down Grunting, Roaring, and Whistling as due to the same cause. Splints and Sidebones were hereditary. Laminitis could be induced by careless feeding. He knew of sires having Laminitis, but never heard of their progeny being affected. The worst cases of Laminitis were seen in deep-footed animals, and they rarely become sound. He did not agree with Mr. Stephenson in his remarks about Sandcrack, and thought this disease was more frequently due to accident, and partook more of an injury than disease. Curbs were hereditary. If a sire got Curbs he produced curby hocks. In his opinion Broken Wind was not hereditary. With regard to acquired defects, fox terriers sometimes drop pups without tails. He thought they should be unanimous on the subject.

Mr. A. HUNTER said one thing Mr. Stephenson had not mentioned in his paper, and that was crib-biting. He was inclined to think that it was hereditary.

Mr. NISBET thanked Mr. Stephenson for his paper, and said he agreed with almost everything he had said. He did not think chronic Laminitis was hereditary. He thought Splints were peculiar to the horse, as they were rarely seen in cattle or donkeys. He mentioned two very interesting cases in breeding. One was a mare; all the colts she had were sound and could race; the fillies could not, and were of no use. The other was a mare that had a box foot. All the mares she bred had the same defect, but the colts were all right. He would like to suggest that the papers should be printed, and sent to each member before the meetings. He also related a case in which a stallion had the peculiar habit of standing with his hind legs crossed and a number of his foals stood exactly like him.

Mr. PEELE said that he could not add much to the discussion. With regard to Whistling, he thought that it seldom turned into Roaring. He thought an animal affected with Laminitis might produce stock having a tendency to the disease. In the county of Durham they looked well to the sires, but bred from any sort of mares. In his opinion the mares should be as sound as the sires. He found that Umbilical Hernia frequently ran in families. Scrotal was not so common.

Mr. A. CHIVAS expressed the pleasure with which he had listened to the paper, and agreed with a good part of it. He thought that Grunting was the forerunner of Roaring, and it was very questionable whether Laminitis was hereditary. If a mare with good sound feet became affected with Laminitis he would have no hesitation in breeding from her; but if the feet were not good before he would not breed from her. With regard to Open Urachus he always found it in connection with Scrofula. He recently had a great number of foals affected with this disease, and they were all got by one horse. He related a case of a mare which bred a foal for three years, and all of them died from this disease. The mare did no work, was taken in to foal, shut up

in a box, and well fed. He advised the owner to make no alteration in the feeding of her, simply letting her get what was in the field. He allowed her to foal in the field, and she has since bred three foals, and none of them are affected with Scrofula.

Mr. GOFTON thought that Umbilical and Scrotal Hernia were hereditary, and coarse-bred animals were more liable to Laminitis than others which were better bred. He instanced a brood mare which was a bad roarer, and all her stock were similarly affected.

Mr. AWDE said he would object to brittle feet as the most likely to produce Sandcrack. He agreed with Mr. Peele that more attention should be paid to the mares that are used for breeding purposes. He considered Umbilical and Scrotal Hernia and Grease were hereditary.

Mr. MOORE said he would not like to say that Laminitis was hereditary, but agreed with Mr. A. Hunter that crib-biting was.

The PRESIDENT said one thing Mr. Stephenson had not mentioned, which he considered was most certainly hereditary, and ran in families to an alarming extent, and that was "bad temper."

Mr. STEPHENSON, in reply, said all the statements he made in his paper referred solely to breeding animals. He could not agree with Mr. Brydon respecting Grunting being developed in old stallions. If he found a stallion on examination was a grunter he would condemn him. What Mr. Brydon had stated with regard to 700 mares being served by a horse affected with Laminitis, and none of their progeny having the disease, were the facts which were wanted; but what he wanted was that only perfect animals should be bred from. Mr. Brydon confirmed what he said about acquired marking. He did not agree with Mr. McGregor that Sandcracks and Broken Wind were not hereditary. The cases that Mr. Nisbet had related were most interesting. He could not agree with Mr. Peele that Whistling did not turn into Roaring. Umbilical Hernia he had found to run in families. He agreed with the President that bad temper was hereditary, but it was not an unsoundness. He concluded by reading several interesting extracts from an American journal bearing on the subject, and said what he wanted was that both animals should be perfect; but if this could not be got it was of the utmost importance that the sire should be perfectly sound.

The PRESIDENT was desirous of going through the different diseases mentioned in the paper, and taking the opinion of the members as to whether they were hereditary or not. After considerable discussion it was ultimately agreed to, on the motion of Mr. MOORE, seconded by Mr. NISBET, "that the paper, and remarks made by the members on it, be printed and circulated among the members only, for discussion at next meeting, and if desirable the President and Secretary may call a meeting of the Association before the usual time if they think it necessary."

A letter from Mrs. H. Peele, West Hartlepool, acknowledging a vote of condolence on the death of her husband, passed at last meeting, was ordered to be entered upon the minutes.

The PRESIDENT reported that he had received a letter from Mr. Wilson, Berkhamsted, on the subject of the horse-tax, and that he had written to each of the Members of Parliament in the counties and boroughs of Northumberland and Durham on the lines suggested by Mr. Wilson, and had received favourable replies from them all.

The SECRETARY read the alterations to the rules which the Committee elected to revise them had agreed to. The report was confirmed, and copies ordered to be printed and sent to each member.

Mr. TUDOR exhibited some interesting morbid specimens.

Mr. MOORE proposed, and Mr. MCGREGOR seconded, a vote of thanks to Mr. Stephenson. Carried *nem. con.*

Mr. STEPHENSON said he was pleased to do anything for his friend Mr Dudgeon, and it was at his suggestion he had prepared the paper.

A vote of thanks to the President terminated the meeting.

G. R. DUDGEON, *Hon. Sec.*

THE WESTERN COUNTIES MEDICAL ASSOCIATION.

THE tenth meeting of this association was held at Chubb's Hotel, Plymouth, on October 29th, J. P. HEATH, Esq. (President), in the chair.

There were also present—Messrs. W. H. Thomas, T. Endle, J. Squire, W. H. Bloye, P. G. Bond (Plymouth), A. H. Oliver (Devonport), R. E. L. Penhale (Hatherleigh), T. T. Harvey (St. Columb), J. H. Penhale (Bideford), J. Hammond, A.V.D., W. Penhale (Holsworthy), and the Secretary.

Letters and telegrams of apology for inability to attend the meeting were received from—Messrs. H. P. Chase, G. H. Elder, C. Parsons, C. Hoadley, T. Olver, and J. A. Collings.

The minutes of the last meeting were read and confirmed. Messrs. Baker, of Crewkerne, and Bond, of Plymouth, were elected new members of the Association.

The PRESIDENT stated he had been in communication with Mr. Goschen, through Sir Stafford Northcote, relative to the tax on horses, and there was every probability of veterinary surgeons being placed on the same footing as medical men, if veterinary surgeons called on their respective members of Parliament to vote for the exemption.

Mr. J. H. PENHALE related the singular case of a cow which had a nail piercing the left hemisphereof the brain for an inch and a-half, and although the animal showed some inability to walk, yet she ate her food and ruminated for twelve hours after first being observed unwell. The nail was discovered at the post-mortem examination.

Mr. Squire exhibited a large calculus found in the single colon of a horse, and which produced stoppage and death.

Mr. HARVEY recommended tracheotomy as a preventive of severe cases of straining, due to irritation of the uterine organs; he had successfully treated a cow in this way.

The PRESIDENT then read a paper on

THE LAMB MORTALITY.

GENTLEMEN,—It is rather an invidious position to be placed in, when, as President of this Association, you are politely told by our respected Secretary almost at the last moment, that he has failed to induce any of the members to bring forward an essay for discussion, and that perhaps you will give a Presidential address.

Now, having only a few meetings ago had such an address from one of our most able members, I felt I should be at a loss to find anything new to bring before you. I also felt that it would be somewhat of a reflection on me as the object of your selection for my responsible office, did I allow you to assemble during the year without something to be discussed besides the ordinary routine of business.

Therefore, at the same time that I introduce a somewhat novel subject to your notice, I expect more benefit to accrue to the profession and to the public from its being thoroughly threshed out in debate by practical men like those I see around me, than by a short crude paper, written in such a brief period of time, and, therefore necessarily undigested and incomplete.

If your time should be found to have been unprofitably spent, I hope you will not think that such was my desire, but attribute it to the want of ability; be magnanimous *before*, as I am sure you will be *after* dinner, and take "the will for the deed."

The subject I beg to introduce is that of "The Lamb Mortality," on which many may remark that they did not know that there was any mortality amongst lambs, simply because there are no statistics published by Government, the diseases which are most fatal in an ordinary, or general way, not being included among those which come under the operation of the "Contagious Diseases (Animals) Act." But when I tell you that, of my own personal knowledge and calculation, over 10,000 lambs have died since weaning time this year, in this county alone, that it is the exception to find a farm of any size on which from five to twenty-five animals have not been lost, that in one instance 120 out of a total flock of 180 lambs have died in my neighbourhood, and that in several cases during the past two or three months, the farmers were losing them so fast that they had the whole of the young flock sold for what they would fetch, to the butchers, to be killed in store condition —then I think that you will consider that the subject is not an unimportant one to ourselves, to our national food supply, or to the public health.

Being satisfied that there is such mortality, the question arises, What is the cause of it?

To an experienced expert, who, perhaps like myself, for over twenty years has been consulted about from twenty to thirty thousand lambs per annum, there is no difficulty in answering the question. There are *several* causes, differing in different seasons, but only three or four principal causes, and these largely dependent on their treatment by their owners.

The principal causes this season have been the cold, wet, inclement weather, and the injudicious use of the sheep-shears. The greatest losses I have found among those lambs fed only on young watery green crops, grass, vetches, etc., and which had been shorn during wet weather, the quality of the food not giving the animals the stamina necessary to successfully resist the chill to the system. It seems to me to be wrong for farmers to fix the day for the gang of shearers to strip their flocks, regardless of what the weather may be; the old sheep may be able to stand the process, but I have little doubt but that the seeds of disease are thereby sown to a great extent among the lambs. The same remark also applies to the weather, and the state of their health before dipping. In making post-mortem examinations of such cases, I found that the appearances differed in different animals of the same flock, the chill in some cases settling to inflammation of the lungs, in others to inflammation of the muscular structure of the bowels; while in some the mucous membranes of the stomach and bowels appeared to be the only parts affected, just as chills among ourselves find out the weakest spot in the system. The losses from the above causes were much fewer where corn, cake, and manger food had been given to the lambs, and all practical men know the difficulty of getting a young sickly flock to eat this class of foods if they have never tasted them before when in health. In some cases a few late lambs in a flock were not shorn, these appeared perfectly healthy, whilst the remaining portions of the flocks were dying all around them every day, and in one case, a lamb affected with maggots, which was covered with a coarse cloth to keep away the flies, was the only one of the flock which kept perfectly healthy, and I cannot but attribute its immunity to the protection afforded by the covering it wore.

Most of the deaths which I attribute to this cause took place about the month of July, before the ordinary period in which the common Husk or Cough generally shows itself in a dangerous form.

The only treatment I found of any use in the foregoing cases, which of course varied in symptoms from Shortness of Breath to violent Diarrhœa, but were always associated with loss of appetite, was to shelter the whole flock every night in sheds, by which I believe hundreds were saved, and to keep the worst cases under cover in wet weather by day as well as by night,

giving all that would eat it, good hay, corn, or cake, and administering to those which could not be got to feed, nice thick oatmeal gruel two or three times a day, combined with methylated spirits of wine—the cheapest preparation of alcohol we have—half a pint of the latter to a gallon of gruel, administering nearly half a pint of the mixture at a time to the lamb.

The past being an exceptional season, I consider the young flocks required exceptional treatment. Many animals which did not suffer so much have since shown symptoms of a weak state of the system by Dropsical Swelling, especially about the head, due no doubt to holding down the head in feeding on the unripened watery diet peculiar to the season 1888. Later on this year we have suffered great mortality among our lambs from diseases which occur, more or less, in every season, viz., Cough dependent upon worms (Filaria bronchialis) in the windpipe and lungs; Tapeworms in the Stomach and Intestines; Fever of a low Typhoid character; and Scour or Diarrhœa.

The pathology of the cough due to Filaria is so well known to the profession, that it would be superfluous on my part to refer to it. The remedies, too, are well known, viz.: iron mixed with the manger food, and sometimes administered in combination with turpentine, oil of amber, linseed oil, and lime water, etc., many practitioners, especially the non-qualified ones, possessing panaceas for this and other complaints, but in bad cases I have found great benefit from shelter, even in those cases by night, especially in inclement weather. The tapeworms can be got rid of by areca-nut and turpentine without much trouble, when it is known that the flock is infested with these parasites, which, although you may suspect, yet can only be ascertained with certainty by the close watching of their droppings by the shepherds, Many flocks "do badly" from this cause, which, not being commonly apparent, is a great puzzle to the owners. Although these parasites may not cause death, yet they weaken the animals in which they find their habitat, thus rendering them less able to withstand an attack of Husk or Scour, and proportionately more difficult to rear.

The next disease I shall mention, which is very fatal, often destroying nearly the whole of a flock, is a fever of a low Typhoid character, very insidious, not exhibiting very active or violent symptoms, may not even be associated with either Cough or Scour, yet the lambs, in the language of the farmer, will "pine right away," and appear to die of inanition. The cause of this is difficult to ascertain. It may be that the sheep are too *thick* on the land, or that the water they drink may be impure—surface, or stagnant water, as I have found it most frequent in dry seasons, or from chill after dipping, when dewy nights are prevalent, or it may be owing to being kept on dry, indigestible food, prevalent in dry weather. Whatever the cause, the symptoms are a great craving for water; irregular motions, sometimes hard, sometimes with diarrhœa, covered with mucus from the membranes. The conjunctiva becomes nearly as white as paper, the ears droop, and the lamb can scarcely stand for a day, or sometimes two days before death, which appears to be caused by want of nourishment, due to the mal-assimilation of the food by the digestive organs.

If you kill one that is in this semi-comatose state, unable to rise from the ground, you will scarcely find more than a few drops of blood come from the throat; all the internal organs of the body are pale and bloodless, with the exception of the true digestive or fourth stomach, and the small intestines, which show irritation and slight redness on their internal surfaces. The treatment I have found most effectual in these cases has been to administer on the first day, half an ounce of sulphate of magnesia dissolved in warm water, to the whole of the young flock. The next day, and as long as necessary, daily to give cinchona bark, or its active principle, quinine, combined with iron, and those which are past feeding themselves can have these same

remedies in combination with linseed or oatmeal gruel. By these means I have several times saved every lamb I have treated after thirty, and even forty per cent. of the whole flocks had previously died. The best foods I can recommend for these cases (or for any sickly lambs) are rape or cole cabbage, or thousand-headed kale, young clover, and good linseed cake or oats. I know several farms where there used to be great mortality in the lambs almost every year, on which these crops are now grown for the young sheep, by my advice, with most marked benefit to the health of the flock, as in the hottest seasons they form a cooling succulent diet which appears to suit their digestive organs. Occasionally I have found nothing effectual but removing the flocks away altogether to another kind of soil and herbage.

The last disease which I intend to mention is the ordinary Scour or Diarrhœa. This is often associated in lambs with other diseases; for instance, lambs suffering from Husk or Cough are frequently affected with Scour before death. Such cases must be treated for Cough, as before-mentioned, or you will have little chance of curing the case; but the anti-parasitic medicines can be combined with chalk, catechu, opium, or small doses of carbolic acid. Again, Diarrhœa may accompany the low-fever. It is obvious that in such cases you must remove the cause—the fever—before you can expect to cure the Scour, or your treatment would be simply palliative and not remedial.

In other instances it may be simply from improper food, either indigestible, unnutritious, wet, frosty, or insufficient in quantity, which the practitioner must alter in addition to his medical treatment if he wishes to be successful. Often he will find *shelter* a most useful adjunct. Many owners of flocks are now keeping portable shelters to go from field to field on wheels, in the same manner as the feeding-racks are taken all over the farms. This is especially valuable for young lambs in the very early wet spring weather on damp, heavy land. I have recommended them for years, and think the profession may well do so with advantage to their clients.

Apart from the above causes, common Scour in lambs is very amenable to treatment. Often dry food, oats, cake, or hay will stop it if they can be got to eat it. The same kind of food given to the ewes will often remove Diarrhœa from the young lambs they are suckling; if not, in very young animals, under a month old, methylated spirits or brandy alone in starch or oatmeal gruel is generally sufficient. For older lambs the ordinary chalk, peppermint, and opium cordial seldom fails, given in starch gruel, but I prefer an addition of some form of alcohol, and a few drops of carbolic acid. In other instances a little turpentine and opium has a marked effect, but all treatment largely depends on attention to diet, and the close watching of the flock by the shepherd, so as to attack the malady on its first appearance.

In conclusion, I may remark that I have not written a highly scientific pathological paper, because I am addressing a number of pathologists who have studied all these classes of diseases scientifically for themselves, but have mentioned the results of long practical experience and tolerably close observations, some of which will not be found in any veterinary works that I am acquainted with, in the hope that they may be of benefit to those younger members present residing in agricultural districts, helping them in their contests with their numerous quack competitors, at the same time that they benefit their employers, the agriculturists, and so raise the profession in the estimation of the public generally.

Mr. Bond believed the excessive mortality among lambs this season (there was no denying it had been very great) was due to the inclement weather, for during a great part of the summer the storms had been like those of October and November, rather than those of June and July. In such a season young immature animals required more shelter than was generally

allowed them; a liberal supply of artificial food would be found of great benefit. He did not recommend rape, as he had known weakly lambs die very rapidly after being turned into it.

Mr. J. H. PENHALE thought it a mistake to overcrowd lambs on a farm, and it was ruinous to put lambs on old pastures after adult sheep. In this way the soil and pastures, and probably water, also became infested with germs and parasites; in young, highly-bred, and weakly lambs, these parasites found a very favourable home, and if curative measures were not speedily taken large numbers would soon succumb to their ravages.

Mr. SQUIRE related a case of excessive mortality among Scotch sheep, which had been imported by a gentleman to the Dartmoor Hills. At times the fatality was so great that as many as five hundred sheep would die in a single season. He had made numerous post-mortem examinations, and all he could find was a flabby condition of the muscles, and a want of tone in every tissue of the body. He came to the conclusion the system of the sheep required some constituent which the Dartmoor pastures did not supply; he consequently recommended the owner to procure keep for the period of a month every year elsewhere; this proved eminently satisfactory, the mortality among these sheep now being no higher than among sheep generally.

Mr. PENHALE, Jun., said that sheep in his immediate neighbourhood had fared very well during this season; but he quite agreed with the President that young sheep especially required more care and attention than was usually bestowed on them; the lambs certainly should not be shorn, and the more artificial food they got through the first summer and winter the better. In his opinion there was a considerable amount of evidence which would go far to prove that the sheep was not as yet a thoroughly acclimatised animal; this being so, artificial means must supply what was lacking in the sheep's constitution to protect it against our wet weather and westerly gales.

Mr. HARVEY thought it wrong to shear lambs all over their bodies, the wool should certainly be left on certain parts needing protection from the cold, such as the abdomen. He found a great fatality among sheep due to the presence of the *Strongylus contortus* in the abomasum, and for which he found common salts a good remedy.

Mr. HAMMOND mentioned that the Scotch farmers were unable to keep their sheep on the hills during the whole of the year; their custom was to move them south for a time. And the lambs were never shorn until a year old.

A very hearty and unanimous vote of thanks was accorded to the President for his excellent and practical paper. After replying to the vote of thanks, the PRESIDENT said he hoped that all the members of the association would do him the favour of dining with him at his house in Exeter at the annual meeting in March.

The members then sat down to an excellent dinner, and an enjoyable evening was spent.

W. PENHALE, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

A MEETING of this Society was held on October 24th, in the London Hotel, Edinburgh, the President, C. Cunningham, Esq., in the chair.

There was an excellent attendance of members and friends, and letters of apology for non-attendance were received from Messrs. Thompson, Aspatria; Donald, Wigtown; and Cameron, Berwick-on-Tweed.

The following gentlemen were admitted to membership: Messrs. James

Borthwick, M.R.C.V.S., Kirkliston; H. Thompson, M.R.C.V.S., Aspatria; J. Black, M.R.C.V.S., Howgate; J. Brown, M.R.C.V.S., West Calder.

The following gentlemen were nominated for membership: Messrs. J. Cameron, M.R.C.V.S., Berwick-on-Tweed; P. Manuel, M.R.C.V.S., Hawick; Bates, M.R.C.V.S., Edinburgh; Professor Irison Macadam, Edinburgh.

It was proposed by Professor WILLIAMS, and agreed to, that the office-bearers be re-elected. These are—President, C. Cunningham, Esq. Vice-Presidents, Prof. Williams, Edinburgh; J. Borthwick, Esq., Kirkliston; W. D. Connochie, Esq., Selkirk. Hon. Secretary and Treasurer, R. Rutherford, Edinburgh.

It was decided to hold the annual meeting and dinner about the middle of February next.

Mr. STORRIE, East Linton, then read the following paper on "The Measures to be Adopted for the Eradication of Bovine Tuberculosis:"—

A quarter of a century ago Tubercle excited little or no attention, and it is only within the last few years that public interest has been aroused.

It is not our country, however, which can lay claim to the honour of having first taken serious steps in regard to the elucidation of the subject, the principal experiments and researches having been made by foreigners.

France, as usual, is to the front. During the last summer an important Veterinary and Medical Congress was held at Paris, where the disease was thoroughly discussed, and measures proposed for its extirpation. Were some such meetings held in this country, where those connected with our profession might state their experience of the malady, it would tend to throw further light on the subject; and better still, if the members of the medical profession would also add their voices and give their assistance, as they are not only as much interested as we are, but have every opportunity of making important discoveries in regard to the progress of the disease in the human subject. I intend to give you the history of an outbreak which came under my notice some three years ago, in a herd principally composed of pedigree shorthorns.

One morning early in March, I was called in to examine a bull named Strawberry Grower. The cattle-man had noticed the day previous, and also that morning, that he was dull, and not so keen as usual when he was serving a cow named Peach Blossom and another named Ethel, and that he had a sore penis. I was also informed that a two-year old quey (Laura) seemed amiss; she had been served eleven days previously. She kept constantly whisking her tail, and evinced pain when she micturated. On going to the farm I made a minute examination of the herd, and found two bulls (Strawberry Grower and Randolph), three cows (Peach Blossom, Ethel, and Lady Hopeful), and two heifers (Laura and an Ayrshire) all suffering from an affection of the generative organs.

There was a good deal of constitutional disturbance, very quick pulse, and poor appetite in the two heifers. The breathing was very much accelerated; the mucous membrane of the vagina in the cows and of the penis in the bulls was covered with red spots.

A mild dose of salts was given to each, and a lotion of belladonna and acetate of lead was applied to the inflamed parts. At this time I had to leave home for four days. On my return I found both heifers had died, and had been buried. I regretted this very much, as a *post-mortem* would have been of great service in helping me to form a correct diagnosis of the malady. I learned they had presented all the symptoms of acute Metritis. Nothing more went wrong for a week or so, when two cows, Grace and Lady Leander, and a yearling bull in the herd, and four cows belonging to farmers in the neighbourhood which had been sent in to the bulls, showed the same symptoms. A few days after this the two cows first-mentioned, Peach Blossom and Ethel, presented the symptoms ten and eleven days respectively, after having connection with the bull Strawberry Grower.

At this time seven cows and three bulls on the farm were affected, and four cows belonging to outsiders.

All these were treated in the same manner, with a beneficial result, with the exception of Lady Hopeful; there was no improvement in her case.

Tonics were then prescribed, and the application of silver-nitrate lotion to the affected parts, and in about three weeks all but Lady Hopeful seemed to have recovered.

At this time the owner was so anxious to have the services of Strawberry Grower, that in spite of all I could say, he began to use him again, with the result that in three or four days he was found to be worse than ever, and in nine and ten days respectively the two cows Lady Baird and Lady Georgina showed all the symptoms of the disease.

In this herd, then, there were twelve animals affected, three bulls and nine cows, of which there are only two alive at this time, Lady Georgina and Lady Leander.

It will perhaps be interesting to learn what became of these animals. We will take them in the order in which I have first noticed them.

Ethel had one calf to Strawberry Grower, after which she ceased to breed, was fed, and sold for food. The calf was reared and sold for breeding purposes.

Peach Blossom had one calf to Strawberry Grower, after which she ceased to breed, was fed, and sold for food. The calf was sold as a yearling to a neighbouring breeder, but I understand he was hardly ever used, as his penis was noticed to be in a diseased state.

Strawberry Grower and the cow Grace were fed and sold for food in a few months.

Lady Hopeful died seven months afterwards. The *post-mortem* appearances were extensive Tuberculosis of the uterus and lungs.

Laura died a few days after she was noticed affected; she had been in a pining state since she aborted about five months previous. I am inclined to think that this quey was at the root of all the mischief. She had been served by both Strawberry Grower and Randolph about a fortnight previous to my having been called in. The Ayrshire quey died about the same time as Laura, just ten days after having been served by Randolph.

Randolph was used for some months, and did well; he was then fed and sold.

The yearling bull was fed and sold.

Lady Leander had three calves, and is in calf again. All her calves have been sold for breeding purposes.

Lady Baird had twin calves, ceased to breed, was fed and sold. Both calves were sold for breeding purposes.

Lady Georgina has had three calves since; two were sold for breeding purposes, and one heifer is still on the farm, has ceased to breed, and is being fed.

Of the four cows belonging to outsiders, two are still breeding and milking, the other two have been fed. I have now accounted for the whole lot.

Of the other cows in the herd, four or five have since died from Tuberculosis. They never had connection with the diseased bulls, and three of them had no blood connection to the herd, having been bought in.

Another cow had a calf to Strawberry Grower, which was a sickly object at birth; it only lived about a fortnight. It presented all the symptoms of Tuberculosis during life. Unfortunately, I could not get a *post-mortem* made.

In this outbreak I am satisfied you have examples of the disease being conveyed from one animal to another in the act of copulation. Firstly, in the case of the bull Strawberry Grower, probably from the quey Laura;

secondly, from Strawberry Grower to Peach Blossom and other cows. Then you have an instance of its hereditary nature in the son of Peach Blossom and Strawberry Grower, which had the diseased penis. The sickly calf sired by Strawberry Grower which lived only a fortnight, we may safely set down as an instance of congenital Tuberculosis, and in the case of the cows that have died at different times between the date of the outbreak, and now you have examples of the disease being contagious.

Now all this occurred on a farm where sanitary arrangements were everything that could be desired, and where the feeding was faultless. Certainly poverty or badly ventilated buildings were no factors in this outbreak; the animals looked all that the keenest judge could wish, and there were many prizetakers in the lot.

I may take it for granted that all those present are convinced of the dangerous and grave nature of Tuberculosis. There seems little doubt that it can be conveyed from the lower animals to man by the ingestion of flesh and milk from tubercular animals, and it has been proved beyond doubt that it is transmissible from one animal to another through various channels.

Taking this into account, it is surely our duty as veterinarians to consider the best measures to be adopted in order to crush its ravages and for its eradication. In the first place it must be included in the Contagious Diseases (Animals) Act, so as to provide, firstly, for the slaughter of affected animals and the total destruction of the carcase; secondly, for the compensation of owners of the slaughtered animals; thirdly, for the thorough disinfecting and cleansing of the byres; and fourthly, I am strongly in favour of the branding and registering of herds in the case of pedigree and breeding stock, and for the branding of dairy and feeding stock.

These measures would necessarily require to be carried out by a fully qualified veterinary inspector.

The first of these could be carried out on the same lines as for Pleuropneumonia, with the exception that the carcase in every case should be totally destroyed.

Compensation.—I would propose that for one year the amount of compensation should be full meat or dairy value, no exception being taken to pedigree stock, as they are worse than worthless for breeding purposes; it would be an encouragement to owners to get rid of diseased stock. It might afterwards be reduced to three-fourths value.

Disinfection.—The premises where the diseased animal had been kept should be thoroughly cleansed and disinfected with some powerful agent, such as carbolic acid.

Branding and Registering.—I have great faith in a branding and registering measure. There would be a certain amount of difficulty in carrying it out, but we have that to contend with in all innovations of the kind. I would have two brands, one the primary or fatal brand, the other the secondary brand; the former signifying that the animal could not be removed or sold unless for slaughter at a public abbatoir, and that within a certain period; the latter signifying that the animal was under restriction for a time, and that it would always be recognised as having been in contact with a tubercular animal. For example, in an outbreak such as I have communicated to you every animal in the herd would be branded with the first-mentioned brand, and all calves born from the animals subsequently would be branded and included in the restrictions. Of course the brand would become known to meat-inspectors, and careful inspection of the carcase and internal organs would follow.

In the case of an outbreak where only one, or perhaps two animals were affected, the secondary brand would come into requisition. The animals would be inspected, say, at the end of three months, and if every-

thing was found satisfactory the restrictions could be removed, but, of course, the brand would remain. One of the advantages to be derived from this system would be that there would be no danger of animals branded "primary" being used for any but feeding purposes. In the case of the secondary brand the advantages to be gained would be many, especially in regard to dairy stock. A regular system of inspection of dairies would have to be instituted, and of course these "secondary" branded cows would claim special attention. By registering pedigree stock, families in which the disease was hereditary could be discovered and placed under the restrictions of the primary brand. I am quite aware that my remarks are incomplete and imperfect, but if I have made any suggestions which may lead others to follow up the subject I shall be satisfied.

In the course of a discussion which followed, Professor WILLIAMS stated that the question of branding was worthy of careful consideration. Practical experience had taught him that the disease was contagious, and it was desirable that the Government should recognise this at once, and take steps accordingly. It was spreading in a most alarming degree—for one case fifty years ago they had 100 now, and more. An attempt made some time ago in a leading article in a veterinary publication, the responsible editor of which was known to be chief adviser to the Privy Council, to throw ridicule on the theory that Tuberculosis was contagious, showed that they must bring considerable pressure to bear on the Government before they could get anything which would enable them to deal at all satisfactorily with the disease.

Professor LEWIS also stated that they could do nothing with Tuberculosis until it was classed amongst the contagious diseases.

Mr. RUTHERFORD said the matter of the paper was of the utmost importance to the country, and he would suggest that the discussion be continued at next meeting, when, it being the annual meeting, there would be a larger attendance, and when members would be better prepared to consider the subject in all its bearings. And the opportunity might not be an unfavourable one for bringing under review the section of the Departmental Committee's report which dealt with Tuberculosis. At the same time, he did not think that the subject of Tuberculosis would have received the attention it had lately done but for the hue and cry raised by the medical and veterinary professions. There was no doubt the disease was hereditary, and that to a greater extent than was generally supposed, and the chief adviser to the Privy Council was failing in his duty if he attempted to stand between them and a stringent measure for dealing with it. If it was hereditary the absence of a slaughtering recommendation, as in Pleuro, in the Departmental Report, would almost seem to point that legislation at present was for one class—the large cattle-breeder, who wished to export his stock—to have the country declared clean so far as Pleuro-pneumonia was concerned, but wished nothing said about Tuberculosis. In nine cases out of ten outbreaks could be traced to pedigree stock; and the reason that the report did not recommend slaughter in the case of Tuberculosis, was that it would wipe out a large proportion of some of the so-called pure-bred herds in the country.

Mr. HUNTER observed that they did not find that the spread of Tuberculosis was so rapid in man as in animals.

Mr. THOMSON, Aberdeen, also stated that the disease was prevalent to an alarming extent, and they were much in want of measures that would enable them satisfactorily to deal with it. He did not go so far as some in ordering the wholesale destruction of affected carcases, but still there was a danger in the disease, which was coming to be more fully recognised.

Principal W. O. WILLIAMS pointed out that it would be necessary, before continuing the discussion, to make certain as to what they would exactly call Tuberculosis. There were different forms of the disease, all certainly not

equally dangerous. He did not believe the horse was liable to contract the disease.

The CHAIRMAN then mentioned that he had been informed of a case where only after the water-supply had been changed did Tuberculosis disappear. Was the disease simply hereditary? Could bad food, water, air, or anything cause it? Ultimately it was agreed to resume the discussion at the annual meeting.

Mr. RUTHERFORD, Edinburgh, then read notes of two cases illustrative of "Some of the Obscurer Causes of Abdominal Pain in the Horse."

CASE I.

July 5th, 11 *p.m.*—Called to attend upon a horse, property of a coaching client. Found patient was an aged (ten years) grey gelding, who had that day made the journey out and in from the Forth Bridge (eighteen miles) as one of a four-house team, pulling a Highland coach holding about thirty passengers. Shortly after reaching the return terminus, at about 5 p.m., he was observed to be in pain, was got home, attended to by the stableman, and relieved for the time being.

The pain reappearing at 9 o'clock, and not yielding to the simple measures adopted, I was sent for.

The symptoms were those of Gastric Colic—abdominal tympany, arching of the back, severe paroxysms of pain, during which he would draw himself together, and get down, resting his head and chin in an extended fashion, patchy sweating, and, when on his legs, persistent scraping with one or other of his fore feet, and eructation of gas; visible mucous membranes highly coloured; pulse 90°.

He received a draught of Sp. Ammon. Arom. in warm water and oil, which shortly relieved him, and draughts were left, with instructions as to their use should the pain return.

July 6th, 11 *a.m.*—The horse had been tolerably quiet all night, only very occasionally being griped, which would be relieved by his getting rid of wind either by the mouth or anus. Since early in the morning he had not been down; the abdominal tympany is gone, but at intervals he rambles round his box, and has his moss litter all scraped into a great central heap. His mucous membranes are still high-coloured, and his pulse remains about 90°; bowels and kidneys acting freely.

He got no medicine, but was ordered to be kept comfortable, to have water in moderation, and a little mash if he would take it. His pulse and general condition led me to think there was something behind the Colic, so I saw him again in the evening. I was told he had been quiet all day, would drink a little, but eat nothing, standing in one position and place, afraid to move, and perspiring profusely over the near quarter, blowing and groaning on being handled. His near hock and fetlock were swollen and acutely sensitive. Rheumatism at once occurred to me, but I said nothing, as it was just possible he had knocked the limb in the first hours of his illness. Fomentations were, however, ordered, and kept up at intervals throughout the night.

July 7th.—The lameness has left the near hind-leg, and is now as pronounced in the off one. His general condition, however, is better; he eats a little, his bowels are acting well, and the pulse has fallen to 65.

My inquiries into his previous history at this stage was to the effect that he had been subject to attacks of violent lameness on one or other of the hind limbs, but that such, as a rule, lasted no time, and that mild attacks usually wore off on his being sent to exercise, his bowels and kidneys acting freely. No medicine was given, beyond a little nitre in his water. Thin mustard embrocation was applied to his hind legs from the thighs down. In the evening I saw him again, and found him very lame in *both* hind legs, moving with

great difficulty and pain, and with a tendency to do so on his toes. The limbs were fomented, well dried, and later on fresh mustard embrocation applied, and the nitre to be continued in his drinking-water.

July 8th.—Both hind legs are enormously swollen, from the hocks down, but the pain is all gone, and although he walks stiffly, he is not lame; his pulse is 52, and he is looking for food. His limbs were well fomented, carefully dried, dressed freely with flour, and then moderately bandaged. He was ordered to get gentle exercise at intervals, food whatever he would eat in moderation, and the nitre to be continued in his drinking-water.

I saw him again on the 9th and the 11th, on which latter day he was so well that I ordered him to receive his usual diet and exercise, and to go to work after a few days' rest to freshen him.

Up till this date, October 24th, he has had no further attack of his periodic lameness.

CASE II.

July 22nd.—Called to attend a bay carriage horse (aged about twelve years) for Colic of an apparently ordinary type, for which he received a laxative and stimulant draught, with the desired effect.

July 30th.—Called again to same horse, and attended him at intervals up till a late hour of night for continuous colicky pains of a not very severe character, but serious, in my opinion, from the fact that none of the remedies employed gave him any remission of pain for any length of time. His mucous membranes were high-coloured, pulse quick and weak; he was restless, very full in the abdomen, notably bulging outward and downward, but not tympanitic, scraping with the fore feet at intervals. He did not lie down.

July 31st.—Found him decidedly easier in respect that he was not so restless. His bowels have been freely moved, but he still scrapes occasionally, and looks round at a long interval to his sides. He has no desire for food. In the evening he was apparently quite well again and inclined to eat, having taken about three-fourths of the mash given to him, and then lay down.

Aug. 1st.—I received a message early in the morning that he was again in severe pain. I attended him immediately, and found him standing in a propped position in his box, sweating over his body, pulseless at the jaw, visible mucous membranes blanched, and mouth, ears, and extremities deathly cold. My opinion being that there was lesion, in all probability, of the liver, from which he was dying, it would be useless to attempt treating him. Nevertheless, he was warmly hand-rubbed and clothed; mustard embrocation was applied to his limbs, and these afterwards warmly bandaged. He sipped water freely, and advantage was taken of this to give him Carb. Ammonia in it. At this time his head could not be raised to give him anything. In the forenoon I saw him again, and as it was delightfully warm in the sun, I had him brought outside and left there. He would get the sun's heat, and if he died he would not require drawing out of the stable. We found we could now raise his head without tumbling him over, and full advantage was taken of this to give him at intervals a fair quantity of milk and whisky.

Aug. 2nd.—To my surprise he showed signs of rallying. Submaxillary pulse is discernible, and there was a faint colouring of the mucous membranes. He nibbled a little grass. In other respects he is as on the previous day, and received the same treatment. For the next three days there was little or no difference in him, further than that there was a gradual return of the pulse, colour to the mucous membranes, and warmth to the limbs.

Aug. 6th.—His visible mucous membranes are as yellow as a guinea, his

hair stands on end, and as a pupil remarked, there is a yellowish tint over all his body. His pulse, however, was better, of more volume, he was altogether warmer, and had some inclination to eat and drink. This inclination increased, and his strength and condition improved very much under the treatment now adopted. He had mustard pretty thickly applied over the region of the liver at once, and I may here say that he did not again seem to require it. For diet he was allowed bran and oats damped, a mixture of grass and hay, and water *ad lib.* and frequently changed, with a little Carb. Ammonia in it. Thrice daily he received the following draught:—

Aloes, 30 grains.
Carb. Ammon., 1 dram.
Sp. Nit. Ether } a.a. 1 ounce.
Tr. Chiretta }
in a pint of water.

The yellowness of the mucous membranes began to lessen after the second day of its appearance, and his owner began to think he would again do his work. Although very much surprised, taken in, in fact, by the turn for the better he had taken, I could not forget the symptoms he presented a week previously, and I advised my friend not to be too sanguine about him, for I was not.

Aug. 13th.—On the evening of this day he was, for some reason or other, removed from his box into his old stall, where after eating his supper, he for the first time since August 1st lay down, and according to the statement of the night stableman, remained so all night.

Aug. 14th.—On being disturbed by the entrance of the stableman early in the morning, he got up, and in doing so was observed to make a blunder and as if about to go down again. Shortly afterwards, within a minute or two, in fact, he was observed to reel and fall against the side of the stall. A messenger was at once sent off for me, but by the time I arrived he was dead. I was told that from the time he rose until he fell and died, which latter he did in agony, not more than twenty minutes elapsed.

A *post-mortem* examination made the same forenoon revealed rupture of the liver, the organ itself being enormously enlarged, affected with fatty degeneration, and weighing 64 lbs.

The most interesting part of the *post-mortem* was the discovery that there had been a prior rupture of the organ of a date a few days prior, and doubtless of August 1st, the morning he was found pulseless, and with mucous membranes blanched. This rupture was between the liver and diaphragm, and marked by the existence of a considerable blood clot and attempts at adhesion (round the edge of the rupture) to the diaphragm.

Professor WILLIAMS described an unusual case of perforation of the stomach of the horse, the patient being one which had been under his treatment for some little time. The professor's opinion was that the perforation was caused by the action of the gastric juice.

Mr. CUNNINGHAM exhibited the larynx of a horse he had known for a number of years. During life this horse was troubled with an almost constant discharge of masticated food down his nostrils. The abnormality consisted in a very short epiglottis, furnished with a fold of mucous membrane like a hood.

With votes of thanks to the President for presiding, and to the introducers of subjects for discussion, a most excellent meeting was brought to a close.

R. RUTHERFORD, F.R.C.V.S., *Hon. Sec.*

THE CENTRAL VETERINARY MEDICAL SOCIETY.

THE first ordinary general meeting of the above Society for the present session was held at the First Aveuue Hotel, on the 1st ult.

Alfred Broad, Esq., the President of the Society, occupied the chair, and there were present thirty-seven Fellows and visitors. Letters of apology for non-attendance were received from a large number of gentlemen.

On the motion of Mr. MALVEY, seconded by Mr. SHEATHER, the minutes of the previous meeting were "taken as read."

Mr. FITZWILLIAM WRIGHT was nominated for Fellowship of the Society.

The SECRETARY announced that Mr. Frank S. Billings, of the University of Nebraska, had presented two books to the Society. He was instructed to thank the donor.

The PRESIDENT then gave his inaugural address as follows:—

Gentlemen,—I sincerely thank you for electing me to this post of honour; it is a mark of your favour which I greatly esteem, and it should be my endeavour to devote myself to the duties of the office to the best of my ability. Our presidential chair has of late been occupied by clever and capable men, and our Society has gone on prospering; last session was an especially successful one, both in regard to the attendance of Fellows and the interest of the subjects brought before us, so that we have a good example to follow and an excellent record to maintain.

The Central is one of the oldest of veterinary societies, and has, I am proud to say, always held a forward position among its compeers. From the number of its meetings we may fairly consider it the most active of them all, and although during late years we have, when arranging for the monthly meetings, laboured under the disadvantage of a tendency among our essay-writers to wander to other societies and to more public gatherings, we have still had a sufficiency of interesting papers to hear and discuss. Among the advantages claimed for our societies this discussion or intercommunication of thoughts has always occupied the first place, and it is an advantage that we have all felt at our meetings here. Another prominent one is the advantage of meeting and becoming acquainted with our fellow-practitioners. In this respect we are certainly successful. We have not so great an amount of conviviality as other associations, being only annually festive, but we can justly pride ourselves on the hearty good-feeling and concord which prevail amongst us.

It will be expected that I should inaugurate my appearance in the chair with a few words, and here lies my difficulty. Following good precedents, I should give you some original ideas or a comprehensive review of the advances of science as applied to the healing art, but this necessitates a close study of scientific and medical literature, which during the past few months I confess I have not indulged in. Our veterinary periodicals certainly give great evidence of our progress, and will well repay attentive study; any one taking up the numbers for the past six months only cannot fail to be struck with the amount of good work contained there, either in clever essays, brilliant theories, or records of novel and skilful surgery. There is an advance in scientific thought, in amount of research, and in thoroughness of work; still the number of contributors is not large; what is to be wished for is good work by a greater number.

The few words I intend to say this evening just express the ideas which have occurred to me while thinking over the subject of hobbies, the hobbies or recreative pursuits of professional men. The expression that a man "rides his hobby" was brought into use by the ancient "hobby-horse," the forerunner of the modern bicycle, but there is another traditionary saying of later date, to the effect that a man should have one business and one hobby;

it is in the sense here indicated that I use the word. It may be that many of us have no hobby of the kind, or that others have more than one. I contend that the dictum I have quoted is right in both points; it is well for a man to have a hobby, and well for him to have but one. Few words would be needed to prove the usefulness of a scope for one's thoughts and a pleasing occupation in hours of relaxation from ordinary employment; it is even less necessary to enlarge upon the comparative disadvantage of dividing attention between several accessory pursuits at one time if any practical result or profit is aimed at.

It may be asked, "Who looks for other advantage than amusement or recreation in a pursuit of this kind?" This criticism I will endeavour to answer in so far as the querist assumes that if a hobby is to be interesting and amusing it cannot at the same time be scientific and of practical utility.

These leisure-time amusements may be divided into two classes: sometimes they are closely connected with a man's professional work, at other times are in arts or sciences very remote. Many a distinguished member of the medical profession has shone in some department of the lighter arts. Men in our own body have drawn reflected lustre upon the profession by their skill in the same direction; other members of the profession have devoted part of their time to public service in their several towns; and we must remember that individual distinction in these several ways redounds indirectly to the advantage of the whole profession; there is nothing to be said against hobbies or pursuits of this class, and it will by many be thought beneficial to mind and body that the chosen recreation should be as diverse as possible from the normal study. Yet there is much to be said in favour of the opposite contention, and it is this view I wish to advocate. A study of some department of science closely allied to our work *may* be made a pleasure; it is certainly a duty to our profession; and thirdly, it is most advantageous; in other words, it brings reward both to those who follow it and, directly and indirectly, profit to the profession at large; the advantage may even spread in a wider circle, for it is possible for veterinary practitioners to elucidate facts which may assist both students of human medicine and the general public.

Were it not that to very many such work can be pleasant and a relaxation from business, one could not urge it to active practitioners; but it can be so. There is a pleasure in the acquisition of knowledge by one's own efforts, as is the case when original research is undertaken; there is pleasure in looking up and reading all that bears on the question at heart; and there is also the increased interest taken in one's regular duties when, as must frequently happen, the matter in hand is akin to the subject of the practitioner's special hobby, or when a better understanding of the case is arrived at through light thrown upon it by the study pursued in hours of leisure. We will suppose, for instance, that a man takes delight in a close study of bacteriology; can it be denied that great pleasure would be experienced by him if, by means of his research, a doubtful case were diagnosed or a novel fact discovered? Again, we may well suppose that great satisfaction would follow the successful application, in our art, of knowledge acquired by the study, for pleasure, of some department of human surgery or pathology. We may therefore argue that not only does the pursuit of some special knowledge prove pleasurable, but it even makes our routine work lighter and more pleasant.

I have said that study of this kind is a duty, and if it be true that a man should desire the advancement of his profession, it certainly is a duty owing to the profession that he should, at least at some portion of his career and according to his abilities, make it a labour of love to elucidate some of the problems of pathological science. This is within the power of every prac-

titioner; it is only required that he should recognise the duty and set his will to the task.

It will be and has been said that professors of human medicine have more leisure than we have, at least that in their ranks are many more men who have abundant opportunity for research and experiment; this is undoubtedly true, and much has thereby been accomplished, but yet veterinarians are not without opportunities; what has been done can be done again. Taking the subject of literature in view, has not some valuable work been accomplished by members of our profession? I need hardly particularise. We may be proud, too, of the fact that our own Society numbers among its Fellows several who have greatly distinguished themselves by applying their spare time to thought and investigation on subjects connected with our professional work. And work of this kind does, as I have said, bring its reward. It induces, first, self-satisfaction, and it draws the esteem and respect of professional brethren far and near. This may justly be considered worth striving for.

It has long been a general aspiration to raise the veterinary more towards a level with its sister profession, and by no means could this object be attained with greater facility than by individual effort in the direction I have endeavoured to point out. We may already congratulate ourselves that a considerable stride has been taken over the gap which separated us; the difference in intellectual attainments between the representative practitioners of each body has materially lessened, and it will continue to lessen if the standard of education required of intending students be efficient; according to the improvement in the general and scientific education of the recruits so will be the advancement of the profession.

Addressing Fellows of a veterinary medical society on the subject of professional hobbies, I might well draw attention to the work of Mr. Thomas Greaves; the formation and encouragement of such societies was a task of pleasure which he pursued with energy and with signal success. No member of our body so closely and widely identified himself with the work of forming and maintaining our societies as he did, and how greatly the profession has benefited from their establishment! Very much of the interesting work done by members of our body has been due to the instigation of the societies; they have formed so many centres throughout the country for encouraging scientific work and progress, and through the need of essays to be read, have directly incited such work.

We may say that societies such as this exist for the purpose of encouraging studies and work which appropriate the leisure hours of our members, or, as I may put it, our hobbies for the time; that here the ideas formed or results attained may be brought and exposed to the criticism and, it may be detailed, to the admiring applause of our fellow-professionals. In passing I will say that a society such us ours might well take up a hobby of its own, a subject such as the collective investigation of any particular disease, or any point bearing on the intercommunicability of disease between animals and man.

Our societies exist, as I have said, to encourage practical work, and if it is the duty of individual members to endeavour, in their turn, to bring matters of interest or the result of thought before the meetings, it is equally the duty of members as a body to assist the work of progression by regular attendance, by devoting attention to the subject under notice, not merely, do I mean, on the evening of discussion, but beforehand, and by freely stating the results of their experience, and those ideas on the point which will certainly follow its careful consideration.

In conclusion, gentlemen, I reiterate my thanks to you all for electing me to this office, and I trust you will give me your cordial co-operation in trying to make this session a busy and interestingly useful one.

Dr. FLEMING proposed a vote of thanks to Mr. Broad for his excellent address; this was seconded by Mr. WRAGG, and carried with acclamation.

The PRESIDENT having replied, the company adjourned for the annual dinner.

SIDNEY VILLAR, *Hon. Sec.*

ROYAL SCOTTISH VETERINARY ASSOCIATION.

A QUARTERLY meeting of this Society was held in the Library of the Royal Veterinary College, Edinburgh, on the 3rd October, 1888.

The President (Professor Walley) occupied the chair. The following members were present: Messrs. Campbell, Burnett, McFarlane, Fingzies, Reid, senr., Reid, junr., A. Baird, H. Hunter, Gilchrist, Grossart, Player, Scrymegour, Young, Fairbairn, Professor Baird, and Professor McFadyean.

Major Wood, Mr. Pottie, Paisley; Mr. Gillespie, and Mr. Glover, Army Veterinary Department.

Messrs. Bennett, McFarlane, Manuel, Martin, Whyte, and Tibaldi were present as visitors.

The minutes of the previous meeting having been confirmed, the following gentlemen were elected members of the Society:—

Mr. Galloway, Perth, proposed by Professor WALLEY, seconded by Mr. MCFARLANE.

Mr. T. Dollar and Mr. W. W. Dollar, London, proposed by Mr. BAIRD, seconded by Mr. BURNETT.

On the motion of Mr. A. BAIRD, it was agreed to hold the annual meeting in October.

The PRESIDENT then opened a discussion upon the report of the Departmental Committee on Pleuro-pneumonia and Tuberculosis. He said that he was more than pleased with the report for reasons which he had already referred to, but he thought that some opinions expressed in that part of it which dealt with Tuberculosis were rather a slur upon the diagnosing abilities of the veterinary profession. He thought that veterinary surgeons were as capable as, and in some instances more capable, than their more favoured brethren of the medical profession. The statement he objected to was to the effect that there should be no difficulty in diagnosing cases of Tuberculosis. Every veterinary surgeon who had to do with Tuberculosis or Pleuro-pneumonia would know that there were numerous cases where no man could possibly say this was Tuberculosis or this was Pleuro-pneumonia. He himself had met with dozens of cases of that kind, where he could not decide which disease the subject was suffering from.

Mr. CAMPBELL (Kirkcudbright) contended that junior members of the profession knew more about morbid anatomy than the members of the medical profession, and that junior veterinary surgeons would make better inspectors of meat markets than medical men could. At the same time, he thought the work of the Committee had been crowned with success, and the Association should be highly pleased with the report.

Mr. POTTIE (Paisley) stated that Tuberculosis in its early stages could be mistaken for a great number of chest complaints. It was very widespread, and was gradually increasing. In his district there were large breeders of cattle, and he found that infected animals were sold in a great number of cases for human food. One of the animals that had come under his notice was in perfectly good condition, and yet a great number of tubercles were found in it. If it were a fact that the disease was communicable to the human subject, then the sooner those carcases were destroyed the better. He was one of those belonging to the old school, who believed that the disease was not communicable from animals to man. One thing, he thought, that would do more to stamp out the disease than any other would be the discontinuance

of the practice of breeding from animals that were known to be diseased. He found that persons who kept superior Ayrshire stocks, bred almost invariably with an animal whether it was infected or not, and the consequence was that in the second or third generation a vast number of the animals were tuberculosed. For the purpose of inspection the very best veterinary surgeon ought, in his opinion, to be employed.

Mr. H. HUNTER declared that the disease in the animals was usually so far advanced when the veterinary surgeon saw them that there was not much difficulty in diagnosing the cases.

Mr. CAMPBELL moved to the effect that the clause in the report referred to by the Chairman should have the serious attention of the Society; and that, with this object, and having in view the probable desirability of making a representation to the Government, further consideration of the subject be delayed till next meeting.

This was unanimously adopted.

A number of interesting exhibits were made by some of the members, among them being a case of Tuberculosis from a Clydesdale mare, which occurred in the practice of Mr. Campbell (Kirkcudbright). Commenting on this case, Professor MCFADYEAN said that, so far as he was aware, this was only the second instance in which the existence of the disease in horses had been recorded in Great Britain, though, looking at the circumstance that numerous cases had been brought to light on the Continent, it was hardly possible to suppose that these could be anything like the only cases that had existed. In cases of equine Tuberculosis the door seemed closed against the theory that infection had taken place, either through the lymph of a tuberculous cow, or through the eating of tuberculous flesh.

W. D. FAIRBAIRN, *Hon. Sec.*

BORDER COUNTIES VETERINARY MEDICAL SOCIETY.

THE ordinary meeting of the above Society was held in the Bush Hotel, Carlisle, on August 3rd. Mr. J. J. Bell, M.R.C.V.S., Carlisle, President of the Society, presided, and a fair number of members turned up.

Amongst the business was the nomination of Mr. R. Rutherford, F.R.C.V.S., Edinburgh, as a member.

The PRESIDENT also announced that he had received a most satisfactory reply from Mr. James Lowther, M.P., respecting the exemption of veterinary surgeons from the Horse Tax.

On the motion of Mr. JOHN ARMSTRONG, Penrith, a letter of condolence was agreed to be sent to the daughter of the late Mr. Harrison, M.R.C.V.S., of Warcop, Penrith, who was an old and esteemed member of the Society.

Dr. H. J. WEBB, B.Sc., Principal of the Agricultural College, Aspatria, then gave a lecture on "The Poisonous Plants of Great Britain," illustrating his remarks with specimens collected in the district.

POISONOUS PLANTS OF GREAT BRITAIN.

MR. CHAIRMAN AND GENTLEMEN,—The subject of my lecture this afternoon is one that I believe to be particularly interesting to the veterinary profession. For many years the poisonous plants of Great Britain have attracted my special attention, and recently a case of poisoning by water-hemlock, by which several valuable cattle were lost, suggested to me that a discourse on some of the most common and dangerous of British poisonous plants might be interesting to members of this Society.

To begin with, it may not seem at all clear to those who have not thought out the subject why plants are poisonous at all. Accustomed as many people are to the doctrine that all we see upon this earth was made for the especial benefit of man, it must be very puzzling to find plants so deadly that to

taste them means death to man and his domestic animals. The only explanation given in old times was that they must have been the work of the devil, for no one could imagine that aconite or the deadly nightshade grew in the Garden of Eden. Viewed in the light of modern science, the various poisons found in plants are regarded as so many means of self-protection. The hemlock is protected by its poison in the same way that a poisonous reptile is protected by its venom. We find in the keen struggle for existence that is always going on that unless a plant possesses some special quality, which enables it to contend successfully and survive the many dangers and difficulties that beset its life from its very first commencement, it would drop out of existence altogether.

The various plants we find growing wild in certain localities are the survivors in the great battle of life. They are the plants best suited to live under the special conditions of soil, climate, etc., that exist in that particular spot, and as a rule we should find that any artificially imported plant would be beaten out of existence and killed by the natives, unless protected by artificial means.

See the continual war waged against weeds by the farmer in order to protect his crops; how few of them would come to anything if it were not for this artificial protection. If a crop of wheat or turnips be sown and then left to fight it out with charlock and groundsel and other natural weeds, how many ears of wheat should we find at the end of five years time? Very few, I think. When you consider that besides the competition for board and lodging with its hardy competitors it will have to withstand the attacks of the various insects and fungi, the birds and browsing mammals, we may look upon the natural flora of a place as maintaining the balance of power between them. Though some exist in greater abundance than others, yet they all manage to struggle through the year, and successfully mature their seed for the next season. If the climate were to change or the soil become altered in some way, either by draining or through the addition of some special manure, then the balance of power would be disturbed for a time, and some genera of plants would be benefited, whilst others, perhaps, might disappear altogether. We will now proceed to consider what these special qualities are which thus enable the so-called weeds to compete so successfully.

Some owe their existence to their excessive powers of reproduction from the enormous number of seeds they are capable of bearing, so that, although many thousands perish, yet a few manage to ripen their seeds and scatter them by millions; others survive from their capacity to live where the generality of plants could not flourish, as, for example, the agaric and the cactus in the desert, the lichens and mosses on the bare rocks in the arctic regions, and, again, those plants which live constantly in the water.

Some plants boldly take up the most fertile spots, and defend themselves against their enemies by changing their leaves into prickles, as the thistles do, or their branches into thorns, like the hawthorn. The great natural enemies of the green plants are the browsing mammals, oxen, sheep, horses, elephants, and giraffes; hence many plants are covered with spines or thorns in order to protect their tender leaves. The bramble changes its hairs into hooked thorns; the stinging-nettle protects itself with sharp glandular hairs filled with formic acid. There are other plants also which are avoided because of their disagreeable odour and taste, such as most plants of the *Umbelliferæ* and many of the *Ranunculaceæ*. There are others which go a step further, and develop deadly poisons, although it must be confessed that as a rule these poisonous plants give warning to animals not to eat them by their disagreeable odour and unpleasant taste; consequently we generally find that animals poisoned by these plants are either young, foolish animals that want to take everything like babies, or they are driven to it by hunger. There is also the

possibility that the plant may be only just coming above the ground, and consequently the characteristic smell and taste may not be developed sufficiently to warn the animal.

I will now direct your attention to the specimens of poisonous plants we have before us, and the first we had better consider belong to the *N.O. Ranunculaceæ*, famous for the large number of its genera which contain poisonous species. The poisonous juices owe their active principles to various alkaloids, which are classed either as irritants, narcotics, or narcotic irritants; the common ranunculus or buttercup is an example of this order. It is to be noticed that, although most pasture fields are full of buttercups, cattle carefully avoid them. They contain an acrid juice, the chemical nature of which becomes changed on drying, so that they make good hay.

The various species of *Ranunculi* vary mmch in the virulence of their poison, but those which grow in marshes are the worst. There have been cases of horse-poisoning from eating them. By far the most virulent of the ranunculus plants is the aconite or monkshood, a plant cultivated very much in gardens. The stems rise about three feet; roots, two to four inches long, and tapering below, bearing a slight resemblance to horse-radish, for which it has been mistaken. The leaves are dark green and much divided; they have been taken for parsley. Every part of this plant is poisonous, the alkaloid obtained from it being called aconitia, the most powerful vegetable poison known, one-fiftieth part of a grain of pure aconitia being sufficient to kill a dog. On the other hand, this alkaloid is a very valuable medicine, and one might almost suppose Shakespeare was thinking of this plant when he says in "Romeo and Juliet"—

> "Within the infant rind of this small flower,
> Poison hath residence and medicine power."

The therapeutical action of this poison is to slow the heart-beat, and ultimately stop it altogether. It also paralyses the sensory nerve endings, so that it is used as a medicine in fever to lower the circulation, and in neuralgia to deaden pain.

The hellebore is another plant of this order that possesses poisonous properties. The most common poisonous plant in Great Britain is certainly the hemlock, belonging to the natural order *Umbelliferæ*. This plant, *Conium maculatum*, the spotted hemlock, grows on nearly all the hedge-sides in the north of England, and is also very common in the south. It is well known by its hollow stem with purple spots, and offensive mouse-like smell when any part is rubbed between the fingers. This is the plant some supposed to have furnished the poison for the great Greek philosopher, Socrates.

The fool's-parsley resembles the hemlock very much, but it has no spots on the stem, and the foliage is of a much brighter green and more divided.

It is extremely common; its takes its name from the resemblance of its young leaves to parsley. There are also two very poisonous plants of this order to which I wish to particularly direct your attention; one is the *Cicuta virosa*, or common cowbane, grows in ditches, with large leaves, leaflets lanceolate, and doubly serrated. The other is the *Oenanthe-crocata*, or the water-hemlock. I am of opinion that many cattle are poisoned by these plants, and it would be advisable for veterinary surgeons to become acquainted with their appearance. In a case that occurred this spring at Round Hill, in Cumberland, four cows died suddenly from causes that were not well explained, and Mr. Thompson, of Aspatria, suspecting a vegetable poison, brought over the stomachs of these animals for me to analyse the contents, and at the same time he asked me to examine the pastures. Upon doing so I found some young plants of *Oenanthe-crocata* growing in a ditch, some of which had evidently been eaten by the cattle. Upon analysing the contents of the

stomach, the alkaline poison *Conium* was detected, so that it was clearly shown that the animals had been poisoned by this plant, especially as upon removing the remaining animals from the field no more cases of poisoning occurred. This plant may be easily recognised by its peculiar roots, which distinctly resemble a bunch of long white radishes, but not quite so pointed. There are many other poisonous plants which I have only space to just mention, such as the *Atropa belladonna*, *Solanum nigrum*, and *Solanum dulcamara* (the common bitter-sweet), all belonging to the *Solanaceæ*. Among other plants very dangerous to cattle must be mentioned the yew and the rhododendron, along with various fungi, such as ergot of rye.

I shall now be glad to hear the experiences of any gentlemen present who have met with cases of poisoning.

Mr. THOMPSON, of Aspatria, opened the discussion by describing the cases at Roundhill. He said he was called in to consult with Mr. Little, of Abbey Town. The *post-mortem* revealed nothing particular, only that the lining membrane of the first three stomachs peeled off as easily as if it had been boiled, and the ingesta had a sour smell. The symptoms were: head elevated, wild, staring, glassy eyes, pupils dilated, singed-looking coat, sides flattened, belly pendulous, breathing slow and heavy, standing over on fetlocks, trembling and convulsions, and, as Dr. Webb had said, death was attributed to cowbane. Mr. Thompson also referred to some sheep being poisoned by eating the green leaves of foxglove when the ground was covered with snow, and to a case where two cows had died from eating rye-corn on the point of ripening, the animals showing all the symptoms of stomach or grass Staggers.

Mr. PEARS, of Penrith, described cases of sheep-poisoning from eating rhododendrons, when he had used charcoal successfully.

Mr. ARMSTRONG also described cases of rhododendron-poisoning.

Mr. DONALD, of Wigton, criticised Dr. Webb at some length, differing from the doctor on many points, and created a very instructive and interesting discussion.

Mr. HOWE, of Keswick, mentioned some cases where death was attributed to eating alsyke clover.

Mr. BELL, the President, proposed a vote of thanks to Dr. Webb for his valuable paper. He himself had often suspected vegetable-poisoning in some of his cases, but had no facts on which to base his conclusion. He agreed with Mr. Thompson that yew was more deadly when it had laid for some time, and he was pleased that such an instructive and useful lecture had been given during his Presidency.

In reply, Dr. WEBB said that many vegetable alkaloids were dissipated on drying, and rendered innocuous on account of the loss of water.

Mr. THOMPSON then exhibited the following specimens, and made observations on each: (1) A three-pronged thorn (each prong about six inches long, and attached to a common stem) which he had removed from the pharynx of a cart-horse, where it had been located for three weeks, while the horse had been in a registered practitioner's hands for Influenza, and had become quite emaciated. (2) An ordinary darning-needle taken from a cow's throat, where it had been for three days. (3) Large, overgrown last molar tooth, extracted from the lower jaw of a cow. (4) A stone found in the lining membrane of the œsophageal canal, at the entrance to the third stomach; peculiar symptom, a continuous cough.

A lively discussion was entered into on all these subjects.

JOHN ARMSTRONG, *Hon. Secretary.*

THE last meeting of the Border Counties Veterinary Medical Society was held at the Bush Hotel, Carlisle, on the 26th of October.

The President, Mr. Bell, Carlisle, occupied the chair, and there were also present Professor Williams, Edinburgh; Mr. Greaves, Manchester; Mr. Rutherford, Edinburgh; Mr. Burnett, Maybole; Mr. Thompson, Aspatria; Mr. Carlisle, Carlisle; Mr. Carruthers, Brampton; Mr. Howe, Keswick; Mr. Little, Abbey Town; Mr. Crondace, Haltwhistle; Mr. Kendall, Barrow; Mr. Montgomery, Aspatria; Mr. Waugh, Seat Hill; Mr. Stephenson, Newcastle; Mr. Armstrong, Penrith (Secretary).

Several letters of apology were read.

Then the minutes of the previous meeting were read and confirmed.

The PRESIDENT proposed Mr. Rutherford, Edinburgh, as a member, seconded by Mr. HOWE, and carried unanimously.

Mr. THOMPSON proposed, and Mr. GREAVES seconded, that Mr. Faulder be elected an honorary member, and was carried unanimously.

The election of office-bearers was next proceeded with.

The PRESIDENT proposed that Mr. Donald, F.R.C.V.S., of Wigton, be elected President for the ensuing year. He said that Mr. Donald was one of the first to promote the formation of the Society, and had earned the honour of being our next President.

Mr. THOMPSON seconded, and said that Mr. Donald was first to suggest the Society's formation, and he had worked hard for it.—Carried unanimously.

Mr. Bell, Mr. Robson, Mr. McConnel, and Mr. Clough were elected Vice-Presidents. The Treasurer (Mr. Thompson) and the Secretary (Mr. Armstrong) were re-elected.

Mr. ARMSTRONG then gave notice that at the next meeting he would move that Rule 4 of the Society's rules be struck out.

A letter was then read by the PRESIDENT from Mr. Hunting, stating that through indisposition he was unable to be present, but had forwarded his paper by train.

Mr. BELL then read Mr. Hunting's paper.

"HEREDITY—ITS INFLUENCE ON CONFORMATION AND DISEASE."

It may have occurred to some of you that a practitioner from London was hardly the right sort of man to come to the Border Counties to read a paper on this subject.

You all have experience of animals from their birth upwards; you have personal knowledge of their parentage; you also are enabled to directly observe the similarities and variations in form between parent and offspring. I, on the contrary, have little knowledge of stock under four years old, and still less of the parentage. If my duty here were to afford you information, I should certainly be a pretender; but I assume no such office. The duty I shall attempt to fulfil is simply to open the discussion on a subject of special importance, and, just now, of prominent interest to our profession.

I shall attempt to arrange the subject for you; to be suggestive, and to draw from the store of observations you possess the facts and opinions so much wanted to form reliable knowledge on the transmission of disease from parent to offspring. I have no new facts for your consideration. I am going to theorise, but I venture to submit that in all pathological or physiological studies fact and theory are both necessary. Progress is made by a combination of inductive and deductive methods. Your facts and my generalisations may, if guided by the exercise of a little common sense, add something to our knowledge of the subject.

I see no reason to doubt that precisely the same laws are in operation in the transmission of disease, as in the propagation from parent to offspring of conformation, or those less tangible qualities or temper, action, manner and habit. If, then, we first refer to the general laws affecting heredity, we

shall be in a better position to consider the special subject of transmitted disease.

The great law is that "like begets like," the truth of which is daily evidenced in the reproduction of type by animals of all sorts of recognised breeds. The offspring resembles *both* parents, partaking more of less of the form and character of each. I say *more or less* because we do not find, in practice that the inherited characteristics are an exact average of those possessed by both parents. We do not, for instance, find that if one parent be sixteen hands high, and the other fourteen, that the offspring is fifteen hands; or that if one possess a smooth coat, and the other a curly one, that the progeny exhibit a coat just between the two.

There are certain influences to be considered, which modify the general law.

It is acknowledged that the longer the duration of a peculiarity in a breed, the greater the certainty of transmission.

That the male possesses a greater power of transmitting his peculiarities than the female.

That some parents—either male or female—possess a special power of impressing their peculiarities upon the progeny—this has been called prepotency.

That some animals, instead of showing a resemblance to their parents, show a greater resemblance to some more remote ancestor—atavism, or "throwing back."

There are other influences which affect the inheritance of peculiarities; such as age, food, work, and climate, which may increase or diminish the probabilities of like producing like, and there is one condition which increase them. It is stated by Darwin in these words: "When any peculiarity of structure or constitution is common to both parents, it is often transmitted to the offspring in an augmented degree."

Another general principle which may be accepted is that at whatever period of life a peculiarity first appears, it tends to reappear in the offspring at a corresponding age or earlier.

Now, bearing these facts in mind, the wonder is that all distinct breeds of animals should show any individual peculiarities. We might almost expect them to arrive, in course of time, at a regular pattern, presenting such slight variation as to be only detectible to the eye of an expert.

There are, however, other agencies at work as well as the master one, expressed in the words, "like begets like." The food, the climate, and other conditions of life, produce deviations in structure of animals, which are transmitted. When a variation renders an animal more fit for the surrounding conditions, it soon becomes more pronounced; and when careful selection favours that variation, it is sure to increase. The crossing of distinct varieties also gives rise to deviations.

In the care of our domestic animals, then, where we can absolutely control their increase, we have the power, if we only use it, either to vary or to intensify the structural conformation, or even the functional peculiarities of the individuals. In no part of the world is this better known than in this kingdom, where every one of our breeds of stock stands pre-eminent in those characteristics which render it most useful to man.

Unfortunately, not only have our animals inherited the valuable peculiarities of structure and constitution possessed by their ancestors, but they have, in a large degree, had transmitted to them some of their infirmities. If our practical breeders had recognised the fact earlier that some diseases were capable of transmission as certainly as definite forms of structure, we should now have had fewer unsound horses. An inherited disease does not obtain the same recognition as an inherited defect of form, for many reasons. It

does not appear at once—it only develops after the lapse of some years; and then may be credited solely to some direct exciting cause. Diseases, too, which only appear, as a rule, at four and five years old, may not appeal to a breeder's self-interest, as at that age he has frequently sold the animal, apparently sound, and all trace of its parentage becomes lost by the time defects appear.

It is impossible to discuss the question of hereditary disease, apart from the question of inherited make and shape. There are certain conditions of limb, which undoubtedly predispose to disease; as long pasterns to Sprain, certain hocks to Curb, flat feet to Laminitis, and dry horn to Sandcracks. We recognise also a light middle as leading to want of stamina, a long neck as often accompanied by Roaring, and even certain shades of colour as indicative of greater or less constitutional merits.

But a special conformation does not always co-exist with a definite defect or disease. If it did, the relation of cause and effect would be unmistakable. If we always found sickle-hocked horses with Curbs, and all Curbs on sickle-hocks, we should justly draw the inference that one was cause and the other effect. No such clear connection has yet been traced in any of the diseases we are inclined to classify as hereditary.

If we look over a list of them, we shall find that every one of the pathological conditions may arise under circumstances in which it is impossible to impute heredity as a cause, and not infrequently where a distinct exciting cause, of an extraneous nature, can be postively indicated.

An accidental slip may produce a "Curb," and "strangles" may give rise to Roaring in animals of the very best type of conformation, and possessing parentage of undoubted soundness. We require more facts to enable us to say what diseases are transmissible, and what conformations are likely to lead to serious defects.

That conformation is transmitted and that some diseases are inherited is beyond dispute. How are we to recognise these diseases? When it can be clearly demonstrated that a disease or defect is the result of accident, what reason is there to imagine it may be transmitted? We know that, as a rule, changes of structure due to accident are not transmitted; and there is abundant evidence that alterations of form, resulting from mutilation or injury, are seldom reproduced in the offspring. There are cases, however, in which the opposite obtains. Twisted horns, deformed legs, and blind eyes have been recorded in the offspring of parents suffering from similar defects due to injury. Against this may be put the cases of mutilation practised by some savage peoples for generations, with apparently no effect in producing hereditary deformity. In the lower animals, too, we may point to the "docking" of horses and "cropping" of dogs, repeated through generations, which fails to shorten the tails or ears of the produce of such animals.

Amongst our patients, if not in man, it seems to me that a distinction is to be made between mutilations which entirely remove a portion of the body, and those injuries (or diseases) which merely cause a change of structure. The former are practically never transmitted; the latter sometimes are. Possibly the explanation may lie in the fact of the injured or altered organism in one case remaining, whilst in the other it is removed.

Heredity, it has been said, depends upon the general principle that a vital tendency, once established in an animal, continues to run its course not only through that animal, but through its offspring, until deflected by some other cause more powerful; or the same idea may be expressed in other words, thus:—When an organism has adopted a certain line of action, all organisms derived from it tend to follow the same line until deflected. Why an acorn should give rise to an oak, or why equine spermatozoa produce a horse, whilst those of a sheep give rise to a sheep, we know not. We do know

however, that the "vital tendency" of each continues in its own course, and that that course is a repetition of the course run by its predecessor. The deflecting causes we know almost equally little about, but we recognise their existence and that, once in action, the deflection tends to become permanent.

It must not be lost sight of that the "vital tendency" exists in the ultimate cells that compose the tissues of the body, and that it is the state of these that gives rise to all inherited conditions. The cells of the body have each their own function, and in carrying it out exhibit a selective power. Fat cells take up and store fat; pigment cells take up and store pigment. Milk cells secrete milk, and all others—bone cells, muscle cells, etc.—have their special function, which is capable of increased or decreased activity.

No fact is more clearly established than that superior milking and fattening qualities are transmissible. Milk and fat are mere products, and the change induced in the organism which increases their production must be due to the special cells which produce or store them. By selection, then, we can modify the function of the cells of the body, we can increase their activity, and if it is not illogical to suppose that other causes may act deleteriously upon them and cause them to assume the opposite action, if one kind of cell can be acted upon, so can others. The cells of bone may become more or less active; the cells of muscle also may alter in their action, and thus we may have an excessive secretion of bone, or a modification in the action of muscle or nerve. The susceptibility to changes of function may be aggravated by local exciting causes, and thereby be increased, or they may not meet with the necessary exciting cause, and then their action ceases, or, at any rate, does not show any special activity.

If, for instance, fat cells possess an inherited tendency to functional activity, they can only fulfil their tendency when a good supply of food to produce fat be placed within the animal's reach.

If bone cells possess an inherited tendency to excessive formation of bone, their function may be still further excited by the strain of work to which the animal is put. Is it not probable that the inherited tendency in both these cases may be retarded or increased respectively by the supply of food or the effects of work?

This theory, if it be correct, has a direct relation to the hereditary production of good milkers, and also to heredity as a factor in the production of ossific deposits. Cells are the living, formative agents of animal tissues, and they alone can receive the impressions which give rise to functional or structural changes.

Only on such hypothesis can we understand how colour, courage, temper, and such like characteristics become inherited, as well as fattening and milking qualities, and also the more tangible peculiarities of body, head, or limbs.

An animal is a most complex object. Just as an army is made up of a collection of regiments, and these again of many individuals, so an animal body consists of groups of structures which are formed by an aggregation of cells.

The structure and tone of the army is in proportion to the structure and tone of the individuals forming it, and the structure and tone of an animal is in exact ratio to the condition of the cells of which it is constituted. The changes taking place in the unit are at all times important, though seldom very apparent until they, from their intensity or wide diffusion, produce marked effects upon an important part, or perhaps, upon the whole.

The study of the structure and function of the minute organisms of which animals are composed, was a few years ago looked upon as possessing more interest as a scientific study than value as practical work. Now we know that these investigations are absolutely essential to elucidate the problems of health and disease.

Clinical observation is as valuable as ever, but no disease can be understood if we *stop* at that point. When all our observations are made on the animal and its surroundings, we can only complete the investigation by the aid of the scientist, assisted by all the physical appliances at his command.

Facts and experiences relating to the healthy animal cannot be too carefully and widely collected by the practical observer, but he will never quite grasp their full significance without the aid of the scientific biologist and physiologist.

There is no finality in human knowledge, and only dreamers expect the time to arrive when the why and wherefore of any point in nature will be solved. Our duty is to go plodding on, collecting facts, eliminating errors, and striving for light and truth. Every fact recorded, every error corrected, is something added to human knowledge and progress, and no man amongst us is debarred, be his intelligence and opportunities ever so narrow, from experiencing the satisfaction of the feeling of "something attempted, something done," if he will only watch and note the events of his daily life.

Now, gentlemen, we come to the practical question of what diseases are transmissible by inheritance in the horse, and I hope the time I have occupied in preliminary considerations will not be found wasted.

There are a number of diseases which are generally accepted as being of a transmissible nature, and there are some as to which opinion is rather divided. In the present state of our knowledge it will perhaps be wisest to adopt a discreet scepticism, and make no attempt to classify them. I shall simply ask you to consider them seriatim. In doing so, it will be advisable not to confuse hereditary disease with congenital disease. In the one, an animal comes into the world with some peculiarity already developed, analogous to that distinguishing its parent. The repetition of peculiar marks; the deformities resembling changes of structure in the parent due to injury; in fact, all peculiarities developed before birth, are congenital. Hereditary disease, on the contrary, does not show at birth, but develops in time—what is transmitted is not disease, but a tendency to disease. The hereditary tendency may exist, but under certain favourable conditions never develop into disease. It is developed with greater certainty and rapidity when some extra exciting cause assists it—see, for instance, the effect of badly ventilated stables upon eyes, work upon hocks, and respiratory affections upon the larynx.

It is true the line of demarcation between congenital and hereditary disease is not very definite, but it exists, and I am inclined to class as not hereditary all those cases of animals being born blind from parents suffering from injured eyes.

Roaring.—That this disease is hereditary probably no one disputes, but it does not necessarily follow that a "Roaring" parent should always beget a foal which will develop "Roaring." As professional men, I hold our advice should always be that a horse or mare suffering from Roaring is unfit for breeding purposes, and this advice may be very positively relied on when either of the parents of such animals are also roarers. That Roaring may be induced in a horse with no hereditary tendency to it I am not prepared to deny, and it is possible that in such a case the disease might not be transmitted. This argument is no reason for a veterinary surgeon drawing any distinction in practice—the disease is so often hereditary and so serious that it should always determine rejection in a breeding animal. Of course, the owner of of an unsound animal can do as he pleases, and should he be able to afford proof of his animal's innocence, it might be right that individuals or bodies capable of affecting the horse's services should draw the veto placed upon him.

Broken Wind.—The late Professor Robertson taught that this disease was

to be classed as hereditary. I recognise it as sometimes a cause of sterility in mares—or perhaps it would be safer to say as sometimes co-existing with sterility; but I have no experience warranting our accepting it as due to any inherited tendency. We want more evidence.

Diseases of the Eye.—I consider "Cataract" to be hereditary, and also many conditions due to inflammatory action and accompanied by structural changes. Practically, when the outer layers of the eye become opaque, we can only guess the condition of the deeper structures, and a doubt should be given against the horse. Cataract, however small, and all blindness, should lead to veterinary rejection for breeding purposes. The onus of proof of non-transmissibility should rest on the owner.

Splints.—No disease is so positively influenced by heredity as this. Their symmetrical position on both legs, their frequent development without lameness, and their appearance at about the same age in offspring as in parent is strong evidence. Add to this the fact that nearly all our horses show them, that no indigenous breed in a new country does until crossed with European horses, and I think we have absolute proof of their nature. I am told that in the Argentine Republic Splints are accepted as evidence of English blood, and that the equine possessor of this little disease at once becomes of greater value. The majority of Splints are harmless, and therefore only in cases when their position, close to the knee, suggests danger should I notice them in a breeding animal, and then I should not reject unless lameness were also evident.

Spavin.—I think there is sufficient evidence of the influence of heredity in causing Spavins to warrant us in classing it as a dangerous hereditary disease, and in declining always to recognise a horse with them as fit for breeding purposes. When I say horse, I also include mares. I know no special form of hock more liable to Spavin than another, and therefore do not accept conformation as a factor in their production.

Curb.—I have no evidence as to hereditary tendency in this disease, nor do I consider it of such a serious nature as to warrant us in interfering with the use of either mares or stallions suffering from it. Mr. Banham quotes Dr. Shorthouse as saying, "Nine-tenths of the descendants of the famous horse Bird-catcher have a tendency to Curbs." This, it will be noticed, does not say that they *develop* Curbs, and may be only an opinion. You can hardly appreciate a *tendency* till you see its effects. We want more facts.

Windgalls.—I have no evidence of hereditary influence as a cause of this condition, and should certainly not object to an animal for breeding purposes because they were found on its legs.

Bog Spavins.—Not sufficient evidence to warrant their inclusion in hereditary diseases.

Thoroughpin.—Ditto.

Navicular Disease.—I think there is sufficient evidence to warrant us in concluding that heredity is a cause of this disease. I should object to the use of a stallion suffering from it. Professor Williams and Mr. Finlay Dun have both recorded facts in favour of this view.

Stringhalt.—My experience does not warrant me in classing this as hereditary, though there are one or two cases recorded very strongly suggestive that it may be.

Shivering.—Professor Williams records the case of a mare which suffered from "Shivering," and who had three or four colts, each of which became affected in the spine before the age of three years.

Epilepsy—Some forms of "megrims" in the horse are undoubtedly epileptic, and we therefore might assume, from analogy in other animals, that they might be influenced by heredity. We want facts, and I know of none.

Sidebone—With the exception of Splints, probably no unsoundness owes its prevalence so exclusively to heredity as Sidebone. It is the curse of big horses, and should be vigorously attacked by the rejection of all stud animals suffering from it.

Ringbone.—I consider Ringbone one of the very worst unsoundnesses met with in horses, but I am not prepared to admit that it is a transmissible disease. We require more facts to arrive at a positive conclusion.

Diseases of the Feet.—Narrow feet, wide feet, and flat feet are formations undoubtedly transmitted from parent to offspring. Qualities of horn, too, are transmitted to some degree. Unless disease be present, a veterinary surgeon has no right to class these conditions as unsoundness. He may call them hereditary conformations of an undesirable kind, but they are certainly not hereditary diseases. Mr. Banhan, in an very able and exhaustive essay on "Hereditary Disease in Farm Animals," refers to the conformation of feet, and quotes from Dr. Shorthouse a remark concerning "Knight of Kars," who had a club foot: "The horse begat twenty or thirty foals a year, and nearly all the foals had a club foot, and would not stand training and racing." This does not help us much—it is a case of congenital disease being transmitted, and I think there is more certainty of this than of one which arises as the result of hereditary tendency.

Sandcrack.—The existence of a Sandcrack in one foot is no evidence of a transmissible disease. If I found a horse with dry brittle hoofs and Sandcrack in more than one of them, I should consider the condition one of a clearly constitutional nature, and therefore hereditary.

Laminitis.—By this term we mean not only the acute disease, but also the structural changes of hoof produced by it. Mr. Oatway, at a meeting of the Central Veterinary Medical Society, related a case which seems to negative its transmissibility: "A horse named 'Dundee' had Laminitis so badly that he had to be lifted on his feet when a mare was brought to him; another horse named 'Billy Barlow' had it as badly. He knew many and had owned several of these horses' foals, and in no instance that he knew of had one been affected with Laminitis."

Grease.—At the same meeting, just alluded to, Messrs. Mulvey and Caton adduced independent evidence of cases of the transmission by a stallion of this disease. Until evidence of the opposite may be forthcoming, I shall accept hereditary influence as a cause of Grease.

Now, gentlemen, I ask you to reward me for my long journey by supplying a good discussion.

The PRESIDENT: I am simply re-echoing Mr. Hunting's words when I say that I hope the paper will have the effect of raising a good discussion. Mr. Hunting has covered a good deal of ground, though there are some things he has not touched upon that I should liked to have seen mentioned. He then invited the views of the gentlemen present.

Mr. GREAVES: Mr. President, and Gentlemen, I am afraid that any remarks I may make will lack practical knowledge. I am like my friend, Mr. Hunting, in a district where there is very little breeding, and I have had very little experience amongst colts and the breeding from various classes of animals; nevertheless, I have had a little. In the first place, I may say that the impression on my mind as to the conformation of horses is that colts take their conformation more after the male than the female, and the intellectual part or mind partakes more after the female. I remember that we shod a mare for many years, and she had the peculiarity of snatching her feet away from the smith when being shod. She would throw a smith on his face almost in a moment when he was shoeing her fore feet. Now, strange to say, I knew three or four of her colts that had the same peculiarity. Now, in reference to the earliest appearance of defective conforma-

tion, I am one of those who believe that it is in the act of copulation that the die is cast, whether it be in a roarer, or one with Spavin, or Sidebone, or whatever it be. I believe that the taint or strain, or whatever you may call it, is produced at the time of copulation. It may never be developed if circumstances do not aggravate it in after life, but it is certain to appear if the circumstances for its development are favourable. Last March we had in Manchester a paper on Roaring, and since then I have paid a good deal of attention to the subject. I have been in the habit of attending at the knackers and examining a large number of both roarers and non-roarers, light and heavy horses, and in every case where the muscles of the larynx had been blanched and wasted I found the recurrent nerve on that side was defective; not a particle of nervous influence had passed to that side of the larynx, and I believe it had been so from the earliest period of gestation. The nearest approach to the larynx would be six or eight inches, and I am of opinion that the nerve had never reached the larynx at any period of its life, but that the muscles of the larynx were in a perfect condition at the time of breathing, with the exception of the want of nervous influence. I found in the other cases, where there were no wasted powers, the recurrent nerve was perfect, perhaps as thick as a crow quill, and as strong as whipcord; but the other was as thin as thread, and it would break on the slightest tension. This is rather a new view on the cause of Roaring, and I am quite satisfied that there is no nonsense about it. I have seen it in, perhaps, ten or twelve cases as marked and clear as it can possibly be, and anyone that examines these cases of Roaring will very likely confirm what I have said, that it must have existed from the very earliest period of gestation. I came here for the purpose of hearing and learning all that I could—for at present we members of Council have the question to discuss in consequence of an application made to us by the Royal Agricultural Society to state definitely what we believe to be hereditary diseases—and I hope that we shall gain such an amount of knowledge as will be of benefit to breeders and agriculturists throughout the land. I think Mr. Hunting is right in the cases he has described. Roaring, Sidebone, Spavin, Curbs, and Cataract are all hereditary diseases.

Mr. YOUNG mentioned the fact of a stallion which was affected with Shivers, and the disease was transmitted to probably 90 per cent. of his progeny, and another horse which had navicular disease, and was a roarer also, and both diseases were largely transmitted to his foals; also two other horses which were roarers, and both produced a large percentage of roarers.

Mr. ARMSTRONG mentioned two or three horses which were subject to certain diseases, which were very largely transmitted to their progeny; also one horse which had a peculiarity in conformation, and this peculiarity was transmitted to the offspring in almost every case, and any one knowing the horse and coming across his progeny in the district always knew them.

Mr. CARRUTHERS mentioned the case of a Clydesdale stallion which suffered from laxation of the patella, and nearly 75 per cent. of his progeny suffered from the same disease.

Mr. STEPHENSON said that these gentlemen had given the very kind of information that the Council of the Royal College of Veterinary Surgeons want. It is not theory at all that is required; we want the very evidence we have heard to-day, and gentlemen who can prove that unsound horses transmit their disease to their progeny, or even where the progeny has a tendency to develop such diseases as soon as opportunity arises, should afford information. It is not a question of theory, what we believe or think; it is fact we want to be at.

Mr. BURNETT: We are much obliged to Mr. Hunting for his valuable paper. He agreed with him that milking and fattening properties were hereditary, if

the animals were not crossed by inferior blood. Sometimes heavy milkers developed Tuberculosis, and this is hereditary. It is one of the most fatal of cow diseases. I have often seen Shivering in colts of under two years old, and Splints and Spavins, and so on, all, I believe, owing to hereditary influence, also Curbs; Sickle-hocked horses have a strong tendency to throw Sickle-hocked progeny, and they develop Curbs on the slightest invitation.

Mr. HOWE made reference to a certain horse which suffered from disease and transmitted it to his progeny, but which never showed any signs of it till put to work.

Mr. RUTHERFORD: In my mind one can hardly exaggerate the importance of this subject. The Royal Agricultural Society have asked the Royal College of Veterinary Surgeons to take the matter up, and we may safely discuss it. Like our friend Mr. Hunting, I am also a town practitioner, and I certainly have not had the opportunity of country practitioners of watching individual circumstances, which will be of so much assistance to the Council in their inquiry, but it has been my lot to see the horses of a great many countries. I have been one of those veterinary surgeons who have travelled in different lands, and I have always been struck—and it came to me forcibly when hearing the paper—that in all these countries there was great relationship between the conformation and its soundness, and so breeders were very careful to use only sires which were the very best types of their kind. You are all well aware an Arab will not part with a mare, but if one shows any defect she is destroyed, and the pedigrees of their stallions are traced for a very long period. I once saw the pedigrees of three stallions which were traced back between 300 and 400 years. These were sent to the Viceroy of India, and they showed undoubtedly that there never had been an impure strain in the breed. It is marvellous the care taken of conformation, stamina, and other qualities which tend to make a good horse, and I think it is the want of this care in this country that has given rise to the anxiety now existing for facing the question. Any one who has commissions entrusted to him to secure good horses knows of the great difficulty experienced in finding a fair percentage of well-formed, sound horses, with good action and colour. Why is this? Is it not because in many instances the stallions are defective to begin with, and in the large majority of cases the mares were also defective? It was part of my duty while in India to proceed to Australia in connection with remount work, and I was struck with various signs of hereditary influence there. We found, too, in taking horses to India, where they faced new conditions, that the nearer the horse approached perfection or to being thoroughbred, the better he met the trying conditions of the country. I have never been able to keep apart hereditary tendency and conformation. I agree there to a large extent with Mr. Hunting. I think they go largely together. When in Melbourne I was asked, in conjunction with another gentleman, to inquire into the cause of a disease occurring in the colony, showing swelling in the head and lameness of the limbs, swelling of joints, etc. This disease became hereditary, and animals got by stallions affected in this way had a tendency to the disease, irrespective of climatic conditions. The principal causes were attributed to the fashion of breeding from colts which had been heavily trained when their bones were not fit to stand the wear and tear. These horses themselves had never arrived at maturity, and long before they were sent to the stud. The system of giving large prizes for very young horses caused them to put on very severe work to enable them to compete, and these horses being put to the stud at a very early age produced the illness in their progeny. I think this is so in this country too. There can be no doubt about Sidebone being, as Mr. Hunting says, hereditary, and this has no relationship to the formation of the foot. It is almost invariably associated with want of proper form of the feet. There the question comes

up again, "Is it the conformation that is hereditary? or is it not?" It is the conformation, I think. I think it is impossible to consider the matter of heredity without taking also into consideration conformation, climate, and the soil. They could scarcely be separated. There are a lot of diseases peculiar to this country which you do not see in Australia at all. The Australians (twenty years ago) were so particular in their choice of mares, and above all sound sires, it was exceedingly rare to come across a roarer. The disease is unknown among Arab horses, and I never saw a case; and out of 2,000 or 3,000 horses met with in Australia, I only saw two or three roarers.

Mr. THOMPSON: If the Council succeed in getting rid of all the diseases mentioned in the list, veterinary surgeons would have very little to do, because most horses had one or more of the diseases which it was intended to find a remedy for. Broken Wind was seldom seen in thoroughbred and carriage horses, but is comparatively common in cart-horses. Curb is certainly hereditary, and he gave instances, both of Curb and several other defects, being transmitted from sire to progeny. Side-bone is, I think, due more to bad shoeing than anything else; large shoes were put on, throwing all the work on the lateral cartilages, causing inflammation, from which the disease developed. Laminitis I have known in many horses, but I never saw it follow in their foals. I think the conformation of the sire descends to the offspring; and he instanced several well-known cases.

Mr. CARLISLE could not believe that Laminitis was hereditary; well-formed feet might be affected with inflammation from many causes. Shivers, he thought, was hereditary, and said that some horses would transmit it to half their progeny. There are many diseases classed in the paper which I cannot consider hereditary. He also asked Mr. Rutherford if he ever came across a case of navicular disease in the Arab breed.

Mr. RUTHERFORD: I never found such a case, although the horses have the kind of feet one would expect to find it in—long, narrow feet.

Mr. HOWE considered from what he had observed that the offspring of animals with Laminitis were more prone to have Laminitis than others, and you might feed them as carefully as you liked.

Professor WILLIAMS said that he agreed with Mr. Howe that there was a proneness or tendency in animals to have Laminitis whose sires or dams had had the disease previously, and he was of opinion that to go on breeding from such animals the disease became hereditary. The tendency is perhaps not so great from the sire as from the dam. In such cases there is certainly a predisposition to the disease, and it appears on the slightest cause. Bog Spavin and Stringhalt, Mr. Hunting says, require more evidence. It requires no more evidence, so far as my experience goes. Thoroughpin is also hereditary, and those of you who live in Scotland and have to do with Clydesdale horses, will very soon have that impressed upon you. There is no doubt about it, for the last fifteen or twenty years horses have been bred from all sorts of badly bred horses. Bog Spavin, Shivers, and Roaring are all hereditary. As I am on the committee of the Council to inquire into this matter, I don't think I should say much more now. I am going to listen to the evidence that is brought before them, and I trust the Council will feel it incumbent upon them to consult the whole body of the profession on this very important subject.

The PRESIDENT: I can only say that in the words made use of here, in respect to the breeding of horses, that "like begets like," I have seen some of the very best-looking horses and perfectly sound when examined get unsound stock, and instanced one such horse whose progeny had almost every disease that has been mentioned. I think if breeders had paid more attention to their mares we should have been in a better position to-day. Unfortunately, farmers consider anything good enough to breed from, and nearly all the diseases referred to are hereditary. He referred to a mare with Cataract which he

was called in to examine, and found that she had Cataract. He then examined the mother; she also had Cataract, and having a mare in his own possession out of the same mare, she was examined also and found to have Cataract, which proved it to be hereditary. I do not think that Laminitis has much hereditary tendency, and we should not hastily condemn all cases of Laminitis as such; but I think we can class all the other diseases mentioned as having hereditary tendencies; at all events, I would like to have a committee of this Society formed to prepare a list of what they considered to be hereditary diseases; and after some discussion, it was decided that the office-bearers of the Society form the committee to draw up the questions to be put to the members by circular, and that they be requested to return the same with their replies.

Mr. BELL then moved a vote of thanks to Mr. Hunting for his very able and excellent paper.

Mr. GREAVES said he had great pleasure in seconding the proposition, which was carried with applause.

Professor WILLIAMS proposed, and Mr. ARMSTRONG seconded, a vote of thanks to the Chairman, which was carried.

The CHAIRMAN having suitably replied, the meeting terminated, and the members dined together. J. ARMSTRONG, *Hon. Sec.*

WEST OF SCOTLAND VETERINARY MEDICAL ASSOCIATION.

THE usual meeting was held within the Glasgow Veterinary College on October 2nd. The office-bearers for next year were elected: Mr. Weir, F.R.C.V.S., President; Mr. Tweedley, Glasgow, Secretary and Treasurer; Messrs. Houston, Blue, and Peddie.

Mr. ANDERSON, F.R.C.V.S., Glasgow, introduced the subject of "Hereditary Unsoundness," which provoked a profitable discussion, remarks being made by Professors McCall and McFadyean, and Messrs. Campbell, Kirkcudbright; Constable, Inchture; Briggs, Londonderry, and others.

Professor MCFADYEAN mentioned two cases, in which one of the animals may have been said to have no liver at all—a case of nutmeg liver; the other was Cirrhosis of the liver.

A vote of thanks to the President terminated an excellent meeting.

H. TWEEDLEY, *Secretary.*

ROYAL AGRICULTURAL SOCIETY.

At the Council meeting held on November 7th, Sir JOHN THOROLD stated that Professor Brown had presented the following report:—

Pleuro-pneumonia.

During the third quarter of the present year there were 119 fresh outbreaks of this disease reported in Great Britain. This shows a decrease on the returns for the preceding quarter, when there were 151, and a still greater decrease when compared with the corresponding quarter of 1887, when 172 outbreaks were reported. This decrease has been most marked in Scotland; in England the number of outbreaks has only fallen from eighty-seven in the second quarter of this year to seventy-nine in the third, whereas in Scotland the decrease has been from sixty-four to forty, or about a third less. According to the returns for the first four weeks of the present quarter, the disease is increasing in England, there having been thirty-five fresh outbreaks reported in that time, or nearly nine per week, while the average for the preceding thirteen weeks was only about six per week. The decrease in Scotland is not only continued during the past four weeks, but is even more

marked: there have been only five fresh outbreaks, or just over one a week, reported, while in the September quarter they numbered about three a week.

The recent increase of disease in England is due to a series of outbreaks which have occurred in the districts of Shepton Mallet, Wincanton, Yeovil, and Ilchester, in Somerset, and in the adjoining Gillingham district of Dorset, the whole of which are said to be traceable to an outbreak at Gillingham, caused by an infected cow taken from Balham about April or May last year. The number of cattle affected with Pleuro-pneumonia in England during the quarter ending September 29th was 268, as compared with 295 in the previous quarter; while in Scotland there were 133 cattle attacked, as compared with 217 in the preceding three months. In the four weeks ending October 27th, there were eighty-nine diseased cattle reported in England, and eight in Scotland.

The Pleuro-pneumonia Slaughter Order came into force on the 10th of March, 1888, but was not carried out actively by the local authorities until the beginning of April.

Between April 1st and June 30th there were eighty-seven fresh outbreaks reported in England, 295 cattle attacked, and 1,129 healthy cattle were slaughtered under the provisions of the Order.

In the next quarter, ending September 29th, there were seventy-nine outbreaks, 268 cattle attacked, and 1,219 healthy slaughtered, making a total of 166 outbreaks, 563 cattle attacked, and 2,348 slaughtered healthy.

In the West Riding, including the boroughs, Pleuro-pneumonia has very materially decreased this year. The outbreaks during the first nine months of 1888 are nineteen, compared with forty-nine for the same period of 1887. The cattle attacked were forty-six, compared with 151 in 1887. The healthy cattle slaughtered numbered 338, as compared with 107 last year.

In Scotland, in the quarter ending June 20th, there were sixty-four outbreaks, 217 cattle attacked, and 1,597 slaughtered healthy. In the following quarter, ended September 29th, there were forty outbreaks, 133 cattle attacked, and 736 slaughtered healthy.

The total for the six months ended September 29th was:—104 outbreaks, 350 cattle attacked, and 2,333 slaughtered healthy.

The grand total for Great Britain for the six months—April 1st to September 29th—was therefore:—

		Slaughtered.	
Outbreaks.		Diseased.	Healthy.
270	.. .. ..	913 ..	4,681

Anthrax.

There were only twenty-five outbreaks of this disease reported in Great Britain during the third quarter of this year, or about half the number reported in each of the two preceding quarters.

The number of animals attacked by this malady was forty-three, or less than half as many as were attacked in the three months ending June 30th, and only about a fourth of the number attacked in the first quarter of the year.

Swine Fever.

This disease is still prevalent throughout the greater part of England, also to some extent in parts of Wales, and in a few centres in Scotland.

During the September quarter there were 2,088 fresh outbreaks reported in Great Britain; 8,447 pigs were attacked by it. Of these, 3,882, or less than half, were killed, 3,671 died, 995 were said to have recovered, while no less than 420 diseased remained alive at the end of the quarter.

Future returns will probably show some decrease of this disease, as the season of the year has now arrived in which a diminution in the number of outbreaks has been noted in former years.

Since the last meeting of the Veterinary Committee, experiments have been carried on at the Royal Veterinary College with the view to ascertain if feeding swine on diluted Swine Fever virus would protect them from Swine Fever. The experiments have hitherto failed, chiefly, it would seem, on account of the experimental animal being infected before the inoculation has had time to produce any protective effect. This difficulty is insurmountable, because protective inoculation of any kind is not likely to be adopted until an outbreak has occurred, and at the moment of the detection of the disease. It may be taken as a fact that most of the swine in contact with the diseased one are infected. In these circumstances it is evident that inoculation will only be practised in swine which already have the disease in the incubative stage.

A report had been received from Mr. Edgar, one of the Society's provincial veterinary surgeons, of an outbreak of disease in lambs in Kent. It appeared from this report that the animals were affected with Bronchopneumonia, due to the presence of the parasite known as the *Strongylus filaria*. Mr. Edgar had advised the owner to shelter the animals with thatched hurdles, with a more generous diet, and a bi-weekly exposure of the animals to the fumes of chlorine gas.

Professor Brown having reported that the investigation into lung-worm in cattle and sheep sanctioned by the Council in August, 1886, had now been commenced, the committee recommended that a cheque for £50, being the amount of the grant authorised by the Council, be now drawn.

The Committee gave notice that at the next meeting of Council they would move for their annual grant of £500, of which £200 would be granted to the Royal Veterinary College. The Principal had undertaken to present, for publication in the Journal, a report on the investigations carried on at the College with the aid of the present year's grant.

On the motion for the adoption of this report, Mr. DENT said he wished to call the attention of the Council to the statement laid before them by Professor Brown. He (Mr. Dent) was not prepared to express any opinion as to what would be the ultimate result of the slaughtering system, but at the present time they saw that during the six months ending September 29th, 4,681 healthy animals had been slaughtered. They could not put the cost of each animal at less than £10, and the total sum therefore chargeable upon the rates of Great Britain amounted to £46,000, in addition to which there was the slaughter of 913 diseased animals. Speaking broadly, there had been a total charge of £60,000 upon the rates, besides the slaughter of 4,600 healthy animals in Great Britain, in one half year. This was a serious inroad into our herds and a heavy burden upon the rates. Speaking for the West Riding of Yorkshire, he thought it had not been shown that they had been able to make any impression upon the disease. They had carried out the slaughter orders, and in one case had slaughtered the whole of the animals in a herd, amounting to 100. He merely wished to call the attention of the Council to the very serious loss of the live stock, and the onerous charge upon the county rates.

Sir MATTHEW RIDLEY said he should like to state that in his own county of Northumberland they had carried out this policy of compulsory slaughter, and there was not a single person who did not feel the greatest satisfaction at the result.

Mr. JACOB WILSON concurred, and mentioned the fact that this result had been obtained at a cost equal to a rate of only the twentieth part of a penny in the pound.

Professor BROWN said he would merely state, in reference to Mr. Dent's estimate, that, from calculations made in a large number of cases, the loss on the diseased animals might be reckoned at £9 per head, and on the healthy at £6 per head. With reference to Mr. Dent's statement that in the West Riding of Yorkshire no impression had been made on the disease, from the returns they had it appeared that, contrary to the opinion held by Mr. Dent, Pleuro-pneumonia in the the boroughs had very materially decreased this year. On the general question it was very difficult to express any opinion as to the ultimate result of the Slaughter Order as now carried out. It was only during the last six months that any systematic attempt to stamp out the disease had been made. Some local authorities had stamped it out, others had allowed it to take its course. Considering that they were only applying the stamping-out system to a very limited degree, the results of the last six months were very satisfactory. If they could only reduce the disease to moderate proportions, he thought they might make a definite effort and get rid of it altogether.

Army Veterinary Department.

Gazette, October 30th.

Veterinary Surgeon, First Class, John Prosser Adams is placed on retired allowance. Dated 31st October.

Gazette, November 8th.

The following Veterinary Surgeons to be Veterinary Surgeons, First Class, ranking as Captains: Thomas A. Killick, John B. Savage.

Obituary.

IT is with much regret we are called upon to announce the death of Mr. Samuel Lewis Pallin, M.R.C.V.S., of the Army Veterinary Department, which occurred at his private residence, Flore Villa, Weedon, on November 3rd. The deceased had been an invalid for some time past, and his demise was not unexpected, although his loss, at the comparatively early age of forty, will be severely felt throughout the service, where he was respected and beloved by all who knew him. Mr. Pallin belonged to a well-known Irish family, being the second son of the late Mr. Daniel Pallin, of Little Forrest, Swords, county Dublin, and Newabbey, Kilcullen, county Kildare, and brother of Mr. William Pallin, M.R.C.V.S., late Army, and now of Athgarvan Lodge, Curragh; and D. C. Pallin, M.R.C.V.S., of the Army Veterinary Department. Deceased had seen considerable service prior to his connection with the Weedon Depôt, which he joined about two years ago. He was formerly attached to the 8th Hussars, and afterwards to the 18th Hussars; he went through the Egyptian campaign, and was present at the battle of Tel El Kebir. He leaves a widow and four young children—a son and three daughters. The funeral took place at Weedon with full military honours. The deceased graduated in 1869.

Intelligence has been received of the death of Mr. T. Chalwin at Adelaide, South Australia, on September 7th. Deceased, who was fifty-seven years of age, was a colonist of many years' standing, was one of the best known veterinary surgeons in the colony, and had a high reputation in his profession. He was a member and Hon. Associate of the Royal College of Veterinary

Surgeons, having graduated in 1879, though he obtained the Highland and Agricultural Society's Certificate so long ago as 1853; he was also Government Veterinary Surgeon, and Hon. Secretary of the Australasian Veterinary Medical Association, and had for many years been connected with the military forces in his professional capacity, having attained the rank of Lieutenant-Colonel by virtue of long service. According to a local paper, "he had been in bad health for some time, and his death was not altogether unexpected. He leaves a widow and family. The deceased gentleman, who was well-connected, was a native of England, and came to the colony more than thirty years ago. He was first employed at Yankalilla in connection with Government road-work, and also practised his profession as a veterinary surgeon; but he soon removed to Adelaide, where he speedily became well known in his professional capacity, and as a genial, hearty man. In 1882, he was closely associated with the Inspector of Stock when experiments were being made to procure lymph from cows for vaccination purposes, and he had charge of a number of cattle isolated near Hilton for the purpose. He has been Government Veterinary Surgeon for several years, and was sent up to Teetulpa when a disease similar to fever broke out amongst the horses in the North. While at Teetulpa he proved himself very efficient, and rendered good service there and elsewhere. Almost ever since his first arrival in Adelaide, he has been intimately associated with Messrs. Formby and Boase as a veterinary surgeon, and his services were very useful in connection with the selection of horses for the Indian market. He was assiduous in his attention to his duties as veterinary surgeon to the Defence Force. Being a thoroughly good theoretical man, he contributed largely to the medical literature in his particular line, and wrote a number of essays, besides delivering lectures for the Agricultural College. He was a member of the oldest Freemasons' Lodge in South Australia, viz., Friendship No. 1, but when General Owen opened the Military Lodge he joined that." Deceased received the honour of a military funeral.

The deaths are also reported of F. Cummins, M.R.C.V.S., Farnham, who graduated in 1866, and A. Gibson, Aberdeen, a holder of the Highland Society's Certificate since 1868, and M.R.C.V.S., in 1880.

Though not a member of the veterinary profession, Professor Tuson taught chemistry, materia medica, and toxicology for so many years at the Royal Veterinary College, and was in other ways so much identified in veterinary progress that the tidings of his death will be received with pain by the large number of pupils and friends whose regard he had won and maintained. He died on November 1st, aged fifty-six years, twenty-eight of which he had passed at the Camden Town School, the cause of death being Heart Disease. Mr. Tuson was a Fellow of the Chemical Institute and of the Chemical Society, and his reputation as a chemist was enhanced by the discovery he was fortunate in making, of the active principle of the castor-oil bean—*Ricinine;* while his professional knowledge enabled him to introduce certain disinfectants, deodorisers, and antiseptics—the most important of which is a solution of chloride of zinc impregnated with sulphurous acid gas—which are of much value. He contributed a good deal to chemical literature, and also wrote frequently to the *Veterinarian*, of which he was a co-editor for some years. He was the author of a Veterinary Pharmacopœia, which has passed through several editions.

This is the second loss by death which the Royal Veterinary College has sustained within twelve months.

Dr. Azary, of the Buda-Pesth Veterinary School, has died of Tuberculosis of the larynx, after two years' illness.

Professor Verhaar, of the Utrecht Veterinary School, has died recently; also Professor Munoz y Frau, Director of the Madrid Veterinary School.

Notes and News.

A New Microbe.—At a recent meeting of the Paris Academy of Sciences, Professor Verneuil presented, in the names of MM. Charles Richet and Héricourt, a note on a new microbe which they found in a non-ulcerated epithelial tumour at the necropsy of a dog that had just died. In its form and dimensions, its coloured reactions, and in the *ensemble* of its biological characters, this microbe resembles the *Staphylococcus pyosepticus*, analogous to the *Staphylococcus albus*.

Horses in Russia.—The annual report of the Russian Administration des Haras is to the effect that there are 21 millions of horses in the Empire, exclusive of Finland and the Caucasus. In the six State breeding establishments there were 81 stallions, 755 brood mares, and 1,607 young stock, while 470 animals were sold for a total of about £8,000. There are sixty-two racecourses in Russia, and the prizes run for on them amounted last year to about £70,000, of which a tenth part was contributed by the State. There were seventy-seven horse-shows held during the year, and 11,328 animals were exhibited at them, of which number 2,042 were sold. The total expenses of the Administration des Haras amounted to nearly £90,000.

Our Exports of Horses.—According to the official returns there were exported from this country 2,954 stallions, valued at £293,070, or nearly £100 each during the past nine months. Of the number exported, 1,671, or more than one-half, went to British North America, and 568 to the United States. There were 29 sent to Holland, 80 to Belgium, 25 to France, and 581 to other countries. During the past nine months there were exported from this country, 4,358 mares, valued at £250,011, averaging nearly £58 each. There were 780 to British North America, 651 to the United States, 457 to France, 668 to Belgium, 529 to Holland, and 1,273 to other countries.

An Unlucky Racehorse.—Friars Balsam, a racehorse that appeared to have a grand future, some months ago had his jaw injured by the bit, and was unable to run. A quack horse-dentist was called to remedy the damage, but evidently he was unsuccessful, for it was announced recently that: "An operation is to be performed on Friars Balsam's unfortunate jaw, and it will be carried out under the supervision of Mr. Bruce Clarke, lecturer on anatomy at St. Bartholomew's Hospital. It is thought that after the operation and a winter's rest the colt may get back to his old form again, and do good service for the Kingsclere stable in 1889.

Curious Death of a Hound.—Mr. Fetherstonhaugh Frampton, Master of the South Dorset Hounds, writes:—A curious accident happened to one of the best hounds of the pack, which ended fatally. The hound had a hard day, but fed well with the rest of the pack that evening; however, he showed signs of illness next day, and died. My kennel huntsman examined the stomach, and found a long brass rabbit wire (which I enclose), which had evidently been bolted with a leg of a rabbit, and was ultimately the cause of the hound's death.

Glanders among Persian Horses.—Among 121 horses landed in September in Calcutta from the Persian Gulf, four were found to be suffering from Glanders.

Agricultural Society of Victoria, Australia.—Mr. B. Owen Meek, M.R.C.V.S., has been appointed honorary veterinary surgeon to this society, in the place of Graham Mitchell, F.R.C.V.S., deceased.

The Dick Veterinary College.—In the report of the Edinburgh Corporation Accounts for 1887-88, published in *The Scotsman* of November 3rd, the account of Professor Dick's Trust shows that the realised revenue from trust properties was £546 1s. 6d., and from Veterinary College fees, £1,459 6s.—together, £2,005 7s. 6d.; while the expenditure was:—In the

maintenance and management of the trust estate, interest, and expenses connected with loans, £868 15s.; in the management and maintenance of the Veterinary College, £1,194 19s. 4d.; and capital expenditure (further for residue and succession duties, £1,590 11s. 7d.; and for works for enlargement and improvement of the College in Clyde Street, £4,704 6s. 10d.), £6,294 18s. 5d.—making the total expenditure £8,358 12s. 9d., exceeding the receipts by £6,353 5s. 3d., and thus increasing the balance against this account from £6,640 17s. 4d. (including a debt of £927 8s. 2d. due to Miss Dick's Trust) to £12,994 2s. 7d.

THE VETERINARY SURGEONS' ACT.—At the Westminster Police-court, on November 8th, Mr. F. H. Dale, 174, Brompton Road, was summoned by the Royal College of Veterinary Surgeons for falsely representing himself as a veterinary practitioner, and was fined ten shillings.

VETERINARY MEDICINE IN TURKEY.—An Imperial Irade has been issued for the establishment of a Veterinary School at Constantinople.

VETERINARY DISTINCTION.—We have much pleasure in noting that M. Darbot, Veterinary Surgeon and Mayor of Langres, France, has been elected a Senator in the Haute-Marne.

AN ASTOUNDING PHENOMENON.—The *Newbury Weekly News*, of October 25th has the following:—A Toad in a Horse's Windpipe.—Mr. Willis, of North Farm, last week lost a valuable cart colt from a most extraordinary cause. The colt had for a long time suffered very much from difficulty of breathing, and had been attended by Mr. Wilkius, F.R.V.C.S., who did all he could for the poor animal, even going to the extent of performing an operation on the throat to relieve the breathing, but all to no purpose, and the horse's suffering increased so much that it was a most pitiable sight to see it. Mr. Willis determined, therefore, to put an end to its misery by having the animal shot, which was accordingly done. Mr. Pavier cut up the carcase, and on severing the neck at the shoulders, to the astonishment of those present, a fairly sized toad was observed to crawl out from the opening in the windpipe, and the extraordinary cause of the poor animal's sufferings became at once apparent. The toad was almost red when extricated, but it has now assumed more its natural colour. It is now in the possession of Mr. Wilkins.

Correspondence.

QUACKERY AND IMPOSTURE.

SIR,—Upon reading Mr. Fitz-Eassie's letter in the VETERINARY JOURNAL for March last, it struck me that it was not only at home that veterinary surgeons went in for "Unprofessional Advertising," as the enclosed newspaper cutting will show. Beyond stating that instead of the advertisement reading, "I keep two professionals who are experts at worms," it should read, "two bagmen who travel to sell the nostrums," and that the whole thing is a "complete new idea," I will make no further comment. Would you inform me through the Journal if the advertiser is a F.R.C.V.S., as he states? One can hardly believe it. The foot-and-a-half of certain cures is enclosed.

CHARLES J. VYNER, M.R.C.V.S.,
Government Inspector of Stock.

Armidale, New South Wales, *August 31st.*

[The advertiser is not an F.R.C.V.S., indeed there is no one with the same Christian name in the list of Members of the Royal College.—ED. *V. J.*]

HIPPACEA.

SIR,—I wish to warn members of the profession against the tactics of "Henry's Great Indian Remedies Company." A gentleman styling himself

Dr. Seelig, B.A., called upon me a short time ago and left a tin of "Hippacea" for me to try, at the same time asked me to send them a few lines to say how I liked it. I have not sent any, nor do I intend to. A few days after the above gentleman called upon me the company sent to a chemist in the town about £7 worth of "Hippacea" and other quack nostrums, on sale or return. I suppose the move in calling upon me was to get me to speak in its favour, which, along with other testimonials, would soon have found its way amongst my clients. I see there are two gentlemen in the profession who have spoken in its favour. I fail to see how Mr. Pallin can reconcile the following remarks used in his testimonial:—"It seems a good application for recently fired surfaces, apparently encouraging the discharge, preventing irritation, and hastening the healing process." Mr. Mann strongly recommends it for wounds. I must say those who will use such stuff for a healthy wound are not followers of Lister. I think there is sufficient quackery going on at present, which certainly does not need a helping hand from the profession. J. NETTELTON.

Northallerton.

PREPARED MEDICINES.

DEAR SIR,—Once again our attention is drawn to the discreditable method which some veterinary surgeons adopt to bring their names before the public. On the front page of the VETERINARY JOURNAL for July will be observed several testimonials praising the qualities of quack drugs, the sale of which is more or less detrimental to veterinary surgeons. Surely this is a poor way of gaining popularity. When we read of a V. S. ordering a nostrum for his own use it is evident he is too apathetic to prepare his own remedies, or that he is incompetent to do so. "VERAX."

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from C. J. Vyner, Armidale, New South Wales; J. A. Nunn, A.V.D.; E. E. Bennett, A.V.D.; J. H. Steel, A.V.D.; E. Crookshank, London; G. R. Dudgeon, Sunderland; Messrs. Arnold and Sons, London; G. Snowball, Ballarat, Australia; H. Gray, London; J. Nettleton, Northallerton; S. Villars, Harrow; "Verax"; W. Penhale, Bideford; D. Pullin, A.V.D., Dorchester; W. D. Fairbairn, Cupar, Fife; A. W. Lawson, Falkirk; J. Armstrong, Penrith; E. Klein, London; A. W. Hill, London; Professor Brown, London.

BOOKS AND PAMPHLETS: *Sydney Galvanye*, The Horse; *C. G. B. Klophel, M.D.*, Tuberculosis, with Remarks on Some of its Manifestations and Treatment; Bulletin et Mémoires de la Société Centrale de Médecine Vétérinaire; Bericht über Thierarztlicher Verein von Elsass-Lothringen; *N. Lanzillotti Buonsanti*, Trattato di Tecrica e Terapeutica Chirurgica; *F. Roloff*, Handbuch der Gerichtlichen Thierheilkunde; *Professor Brown, C.B.*, Report on Eruptive Diseases of the Teats and Udders of Cows in Relation to Scarlet Fever in Man; *E. Cotterell, M.R.C.S.*, Roaring in Horses.

JOURNALS, ETC.: *Journal of the Royal Agricultural Society of England; Northampton Herald; Mark Lane Express; Archiv für Wissenschaftliche und Praktische Thierheilkunde; Der Hufschmied; American Veterinary Review; La Clinica Veterinaria; American Journal of Comparative Medicine and Surgery; Journal of the Royal Agricultural Society of Victoria; Wochenschrift für Thierheilkunde und Viehzucht; Revue Vétérinaire; Repertorium der Thierheilkunde; Russian Veterinary Journal; Annales de Médecine Vétérinaire; Recueil de Médecine Vétérinaire; Lancet; American Live Stock Journal; Edinburgh Medical Journal; Live Stock Journal; London Medical Record.*

NEWSPAPERS: *Dorset County Herald; Irish Times; Lahore Civil and Military Gazette; Scotsman; Newbury Weekly News.*